- New developments in fourdrinier construction
- Applications of the spiral heat exchanger
- Sulfur dioxide exposure hazards
- Co-ordination of chip supplies

# The Paper Industry

IN TWO SECTIONS—SECTION ONE

Publishers of PAPER AND PULP MILL CATALOGUE

PUBLIC LIBRARY
APR 23 1956
DETROIT

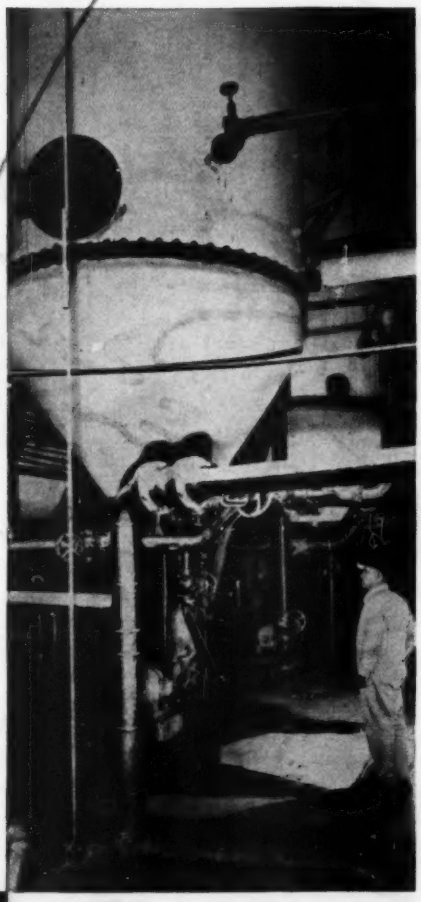
Engineering Service – Always Available

**WHEN YOU USE SWENSON EVAPORATORS**

An important benefit in using Swenson equipment is that Swenson *Lifetime* Engineering Service goes along with it. In the case of a Swenson Evaporator installation, for example, your Swenson Engineer regularly inspects the equipment—analyzes operations and makes recommendations that will improve performance. Call on Swenson Engineering Service often. It is yours to use—any time . . . for the lifetime of the equipment! Write today for complete information!

**SWENSON EVAPORATOR CO.**

15653 Lathrop Avenue, Harvey, Illinois



**SWENSON**

Proved Engineering for the Process Industries

SINCE 1889

A Division of WHITING Corporation

Pulp Washers • Evaporators
Filters • Digester Blow Condensers
Turpentine Condensers

J. R. v. 38 Ap '56 - Mr '57

Hollow club used
in old Chinese theatrical productions,
with the Yang-Yin symbol cut out
on all four sides.

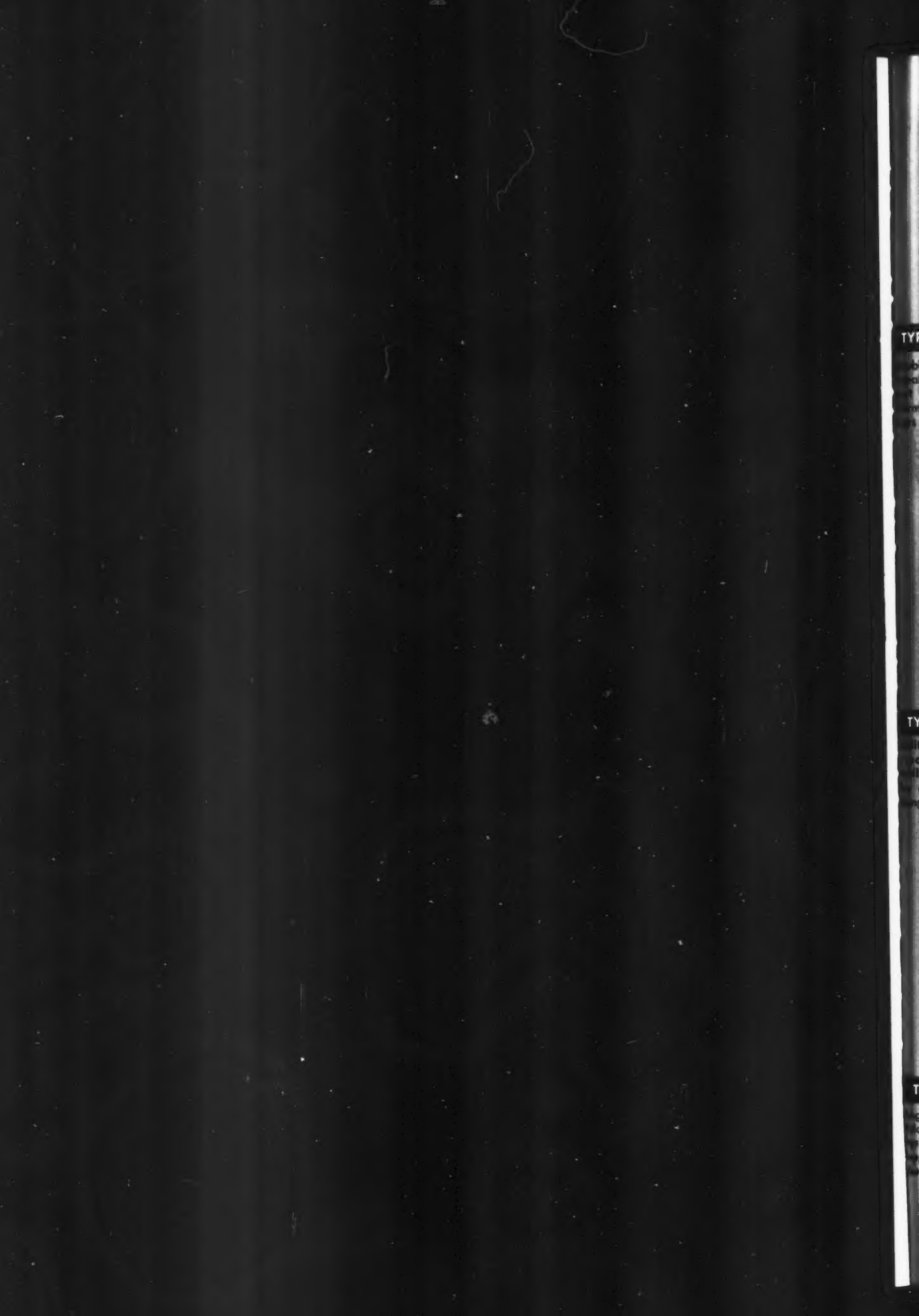
This symbol (Yang-Yin) represents T'ai-chi, the old Chinese *Ultimate Principle*, and as such, *perfection*. As the Asten-Hill trademark it symbolizes *perfection* in paper mill DRYER FELTS.

*Name and trademark registered*

**ASTEN-HILL MFG. CO.**
Philadelphia 29, Pa.
Walterboro, S.C.
Salem, Ore.

**ASTEN-HILL LIMITED**
Valleyfield, Quebec

Text



TYPE 657A

...ble port globe body for conven-...al service. Also supplied single ... where tight closure required. ...may supplied in iron or steel in ...s ½" thru 12".

TYPE 657YY

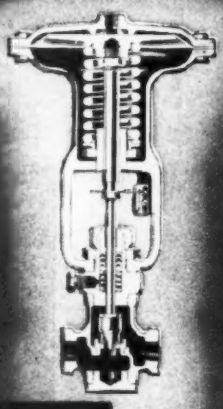
Three-way control valve for by-pass or blending service. Eliminates need for two globe type control valves. Available all castable alloys sizes ½" thru 12".

# FISHER®

## Has the control valve for your mill

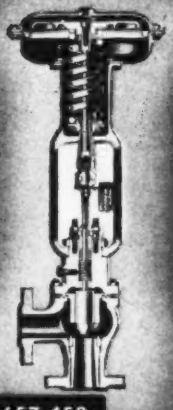
TYPE 667Z

...lit type body in which parts are ...adily accessible, can be econom-...lly supplied in various alloys ... corrosive service. Available in ...nged sizes ½" thru 2".



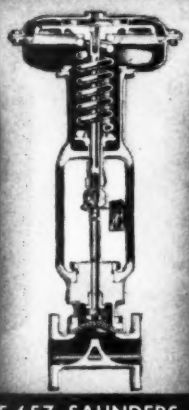
TYPE 510G

Small and compact bronze control valve for relatively light service. Available in screwed sizes ½" thru 2".



TYPE 657-458

...gle control valve for handling ...ids containing solids, or flashing ...ids which are erosive. Normally ...pplied in steel flanged ends in ...es 1" thru 6".



TYPE 657–SAUNDERS

Fisher operator on Saunders patented valve is widely used on "hard to handle" fluids which are viscous and/or corrosive. Available in wide variety of materials in sizes ½" thru 6".

**Special design bodies for process services**

**Wide selection of sizes and available in all castable alloys**

**Supplied with improved diaphragm operator that provides accurate valve response**

FISHER GOVERNOR COMPANY • MARSHALLTOWN, IOWA

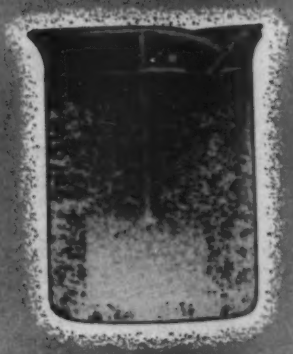
CANADIAN PLANT: WOODSTOCK, ONTARIO

LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL

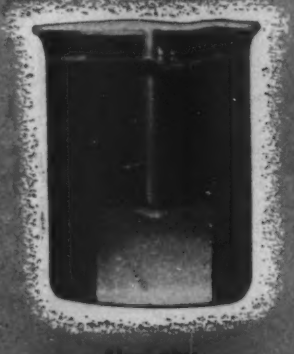
# A New, Better Coagulant

# NALCO 600

POLYELECTROLYTE



Alum



Alum plus typical polyelectrolyte

Alum plus Nalco 600

● As a coagulant in water clarification, and under many process coagulation conditions, new and different Nalco 600 has shown such great promise, both in performance and economy characteristics, that it has now been made available for general use as an established member of the Nalco family of chemical aids to industry.

Extremely difficult coagulation conditions provide especially economical applications for Nalco 600. It can be used alone or in conjunction with other coagulants. A very low dosage of Nalco 600 usually permits as much as 50% reduction in dosage of alum, activated silica, iron sulfate or clay type treatments . . . and results in a cleaner, clearer supernatant liquid.

Nalco 600 was invented in the Nalco Laboratories, and is being manufactured *only* by Nalco. For complete data on Nalco 600, and expert technical assistance to solve your clarification and coagulation problems, call Nalco now.

NATIONAL ALUMINATE CORPORATION

Telephone: POrtsmouth 7-7240

6232 West 66th Place • Chicago 38, Illinois

IN CANADA: Alchem Limited, Burlington, Ontario

NORTHWESTERN UNITED STATES, HAWAII and ALASKA

The Flox Company, Inc., Minneapolis 3, Minnesota

ITALY: Nalco Italiana, S.p.A. SPAIN: Nalco Espanola, S.A.

WEST GERMANY: Deutsche Nalco-Chemie GmbH

ANOTHER *Nalco*® PRODUCT. Serving Industry through Practical Applied Science

# The Paper Industry

*Technology* • *Engineering* • *Management* • *Production*

VOLUME 38 • NUMBER 1 • APRIL 1956


## • Features . . .


Editorial — What next in fourdrinier construction? ..... 5

Whither? — Pulpwood prices, fiber drums for liquids, hydro-air pressure cleaning, sizing mechanism, paper mail bags ..... 90

Woodyards managers report on current problems ..... 7

New developments in fourdrinier construction ..... 29

Use of spiral heat exchangers for heat recovery ..... 32
*by* Leo Walter

Operation of the woodmill unit at MacMillan & Bloedel's Harmac Mill ..... 34
*by* Ralph Brownhill

Sulfur dioxide exposure and control ..... 37
*by* Benjamin Feiner and Sidney Marlow

Kimberly-Clark's noise control program ..... 40
*by* Marion L. Briggs

"Project Logboom" seeks to cut waste in pulpwood holding ponds ..... 42

Use virus disease to kill forest insects ..... 43

This is your life — with paper ..... 44

Crossett puts new mill into operation ..... 49

CPPA announces mechanical logger ..... 49

Perfect scores recorded by Southern Safety Association ..... 71


## • News . . .


News of the Industry ..... 49

Names in the News ..... 67

Necrology ..... 70

Safety ..... 71


## • Departments . . .


Current Comments ..... 47

Coming Events ..... 65

Foreign Abstracts ..... 72

Patent Reviews ..... 76

New Products ..... 80

Current Market Quotations ..... 87

New Books ..... 88

Index to Advertisers ..... 89



**Published monthly by:**
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), Founder

**Publication Staff**

President and General Manager
A. SCOTT DOWD

Vice President and Treasurer
A. C. L. FRITZ

Secretary
A. C. BRUCE

Editorial Director
A. W. J. DYCK, Ph.D.

News Editor
D. W. ZEIGLER

Sales Manager
R. M. McFARLAND

Production Manager
CHARLES E. DOWD

Circulation Manager
JOHN H. REARDON

**Advertising Representatives:**

CHICAGO 5: Jack Henderson, 431 South Dearborn Street, Wabash 2-3543

CLEVELAND 20: Wm. W. Andrews, 3096 Livingston Road, Wyoming 1-7144

EASTERN: Jack Baiz Company, 545 Fifth Avenue, New York 17, N.Y., Murray Hill 2-3345

WEST COAST: Murray Bothwell, 234 East Colorado St., Pasadena, Calif., Ryan 1-9155

THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

Published at 1501 Washington Road, Mendota, Illinois.

Address all correspondence intended for publication to Editorial and Executive Office, 431 South Dearborn Street, Chicago 5, Illinois.

BPA

Member: Business Publications Audit of Circulation, Inc.

Accepted as controlled circulation publication at Mendota, Ill.

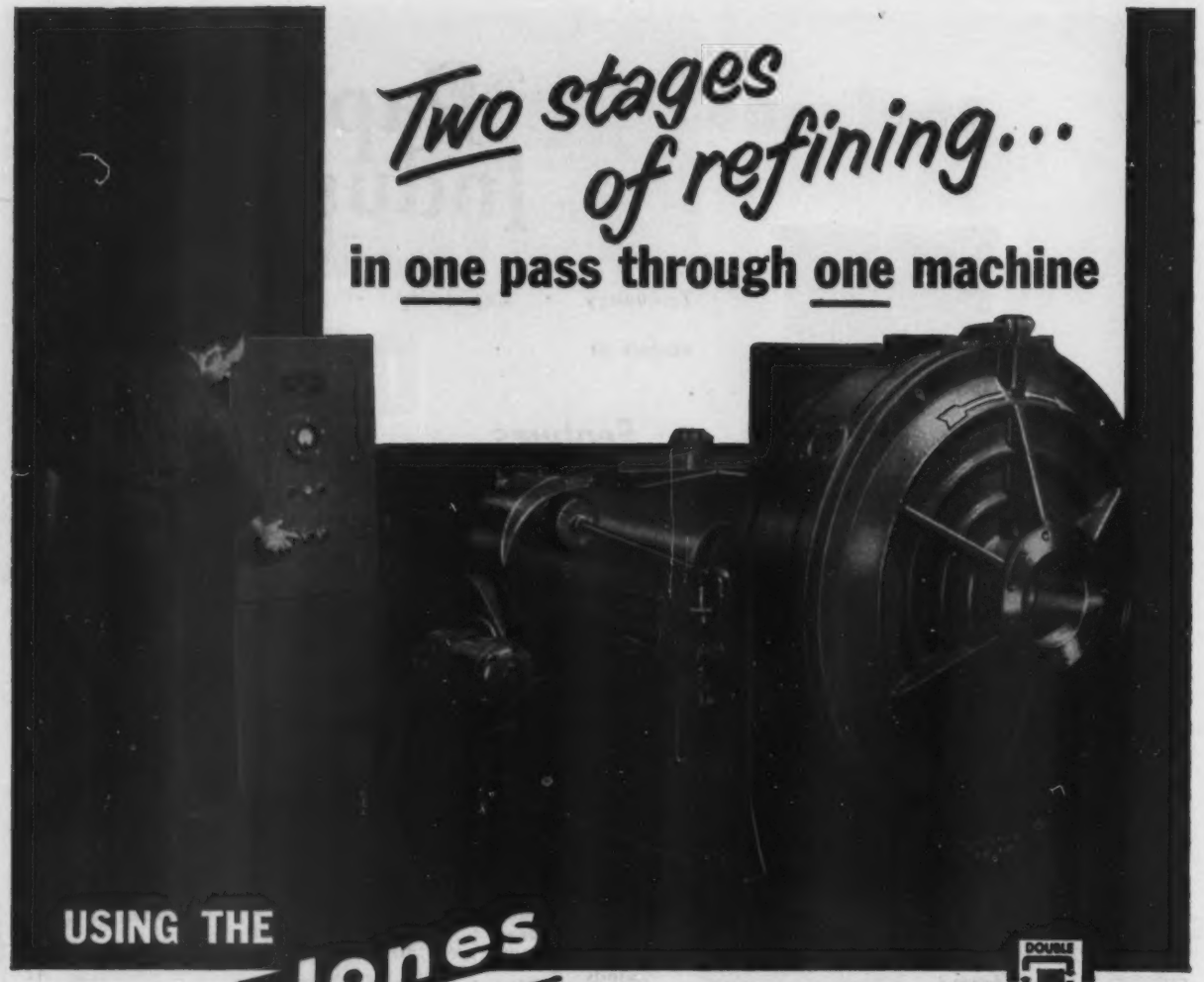
Subscription rates: United States, U. S. Possessions and Canada, $3.00 for one year. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.



The PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index.** An index to each volume is issued annually by the publisher as a part of the April number. © 1956, by Fritz Publications, Inc.

# *Two stages of refining...*

## in one pass through one machine



## USING THE Jones DOUBLE-D with DOUBLE FLO EFFECT

### Does the work of two conventional refiners

That's the record in one big southern mill where the Jones Double-D Refiner has been in regular operation for more than 18 months.

For the Double-D, although new, is not untried. Far from it! Proven by exhaustive tests in a number of mills, this first truly pressurized disc refiner has demonstrated its ability consistently to do the work of two or more conventional refiners.

To learn more about its remarkable performance, clean design, and ease of maintenance and operation, ask your Jones representative or write us direct for Bulletin EDJ-1083.

One of four huge refining discs in the Double-D. Stock, passing under constant pressure between two stationary discs and two rotating discs, gets perfectly controlled 2-pass refining . . . double refining effect.

Jones

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

*From our point of view . . .*

## What next in fourdrinier construction?

Recent improvements in the fourdrinier have led to a degree of productivity in papermaking that seemed unpredictable 20 years ago and which is always viewed as a modern marvel by the uninitiated visitor to a paper mill.

Even those who are intimately associated with the industry and are familiar with papermaking processes cannot help being impressed with the detail and performance of the modern fourdrinier. However, when looking at these in the light of scientific progress in general, and engineering and electronic achievements in particular, the inevitable question comes to mind: "Should we not be even farther advanced in our methods of papermaking?"

Strictly speaking, there have been few basic changes in the construction of the fourdrinier since its invention; even if it is true that the modern fourdrinier in all its engineered splendor does not seem to bear any resemblance to the first machines installed on this continent some 125 years ago.

The progressive changes that have taken place concerned themselves with the elimination of various barriers that lay in the way of achieving (1) greater machine speeds, (2) better paper quality and (3) lower production costs.

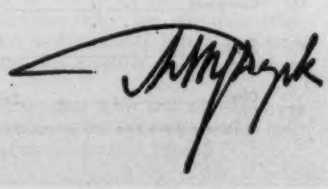
The barriers that had to be eliminated were numerous and complicated. An improvement introduced into one section of the machine invariably entailed bringing the entire machine into balance with it. The result of all the improvements made, and particularly those of recent years (see pages 29-31), is the modern, massive, and highly efficient colossus that produces a continuous sheet at the rate of 2500 fpm or more.

Despite these impressive accomplishments, there is need for new thinking and more fundamental changes in paper machine construction, and this need lately has been receiving the deserved attention of both papermakers and paper machine manufacturers.

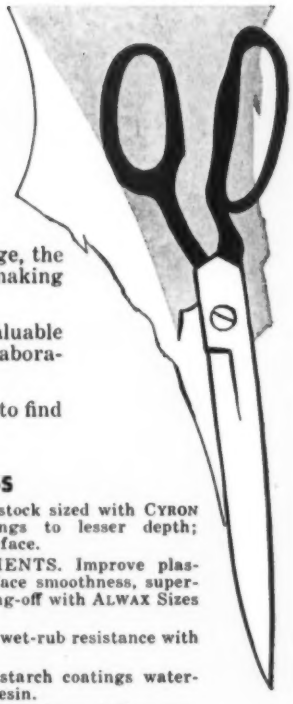
The main reason for the comparatively slow progress so far made in fundamental paper machine design undoubtedly is the high cost of the fourdrinier, which does not nearly permit the same latitude of experimentation that has played an essential part in the spectacular evolution of some of our model exhibits in the fields of electronics and engineering.

Another reason, which however no longer exists, was the reluctance and diffidence in the past shown by both papermakers and equipment manufacturers when confronted with the necessity of considering fundamental changes in papermaking equipment. This reluctance in the past undoubtedly had its foundation in the inability to accurately assess the tremendous impact the pulp and paper industry now has and will continue to have on our civilization.

Today we see the industry's potentialities more clearly, and we can expect, therefore, a materialization of fundamentally new designs in papermaking machines in the years ahead.



# Here's where to look for help on Papermaking Problems!



If you're looking for answers to any of the papermaking problems listed on this page, the best place to find them is at Cyanamid where we handle the broadest line of papermaking chemicals in the industry.

Our Technical Service Staff, trained in every phase of papermaking, can be of valuable help. If they can't give you an immediate answer to your problem, our Research Laboratory or Application Laboratory is available for assistance.

Just run down the list below, and tick off your problems—we'll make it our problem to find the right answer for you.

## SIZING

( ) BRIGHTNESS. Where color is important, Cyanamid offers the lightest grades available anywhere in ACCOBRITE® Rosin Size (X, WG).

( ) COLOR STABILITY. ACCOBRITE shows less degradation on aging than other sizes.

( ) DUSTING. Use low-dusting ACCOBRITE dry, or use liquid sizes (save on handling, too).

( ) COST. There's economy in CYFOR® Fortified Rosin Size (35-45% less required); or in unbleached grades use FF and Dark Wood Rosin Sizes.

( ) FOAM. Use non-foaming ACCOBRITE (zero foam index), low-foaming CYFOR or FF Sizes. Or check foam with CYNOL® Defoamers.

( ) HIGH SIZE SPECS. Boost hard size specifications with CYFOR Fortified Rosin Size (lower cost, too).

( ) ACID AND ALKALI RESISTANCE. Especially effective beater additive is CYRON® Size (needs no alum, rosin or wax). Surface size with CYRON and starch for high ink and lactic acid resistance.

( ) WATER, LACTIC ACID. 25 grades ALWAX® and WAXINE* Sizes to improve resistance to water, writing or printing inks, varnishes and lactic acid. AEROSIZE® Sizes (high free rosin) boost water resistance.

( ) FINE PAPER SIZING. When sizing fine papers use iron-free Alum for highest brightness. Improve surface with CYRON, ALWAX or WAXINE. Reduce pick and curl with PAREZ® 607 Resin.

CYANAMID

AMERICAN CYANAMID COMPANY
PAPER CHEMICALS DEPARTMENT
30 Rockefeller Plaza, New York 20, N. Y.

**Please have your Technical Representative call on the problems checked above.**

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

*In Canada:* North American Cyanamid Limited, Toronto and Montreal

## COATINGS

( ) RAW STOCK. Coating raw stock sized with CYRON takes more uniform coatings to lesser depth; smoother, better printing surface.

( ) CLAY AND OTHER PIGMENTS. Improve plasticity, water resistance, surface smoothness, supercalendering and reduce dusting-off with ALWAX Sizes in clay-pigment coatings.

( ) PROTEIN-PIGMENT. Raise wet-rub resistance with PAREZ 613 Resin.

( ) STARCH COATING. Make starch coatings waterproof by adding PAREZ 608 Resin.

( ) STARCH PIGMENT. Coatings take on higher wet-rub resistance when treated with PAREZ 608 or 612.

( ) COATING ADHESIVES. Control viscosity and fluidify adhesives with AZITE® 900 Liquefier. Also use AZITE to preserve paper strength.

## WET STRENGTH AND OTHERS

( ) WET STRENGTH. Highest wet strength, developed right off the reel, is imparted by PAREZ 607 Resin, a MELOSTRENGTH® Resin. Lower degrees of wet strength secured with urea-formaldehyde resins.

( ) COLOR RETENTION. Better dispersion of pigments and fillers, and better retention of color, secured with ACCOCEL® 741 Dispersant.

( ) LINTING. Linting of wiping papers, towels, tissues and napkins is reduced by use of PAREZ 607 Resin.

( ) ABSORBENCY. Improve water-absorbency of toweling, napkins, or tissues with CYNOL Rewetting Agents – surface or slush-stock application.

( ) PICK. Reduce pick in printing papers by treating with PAREZ 607 Resin.

( ) CURL. Curl in paper can be effectively controlled by addition of ALWAX or WAXINE Sizes or PAREZ 607 Resin.

( ) SOFTNESS. Permanent softness of tissue, absorbent papers imparted by CYNOL Softening Agents.

( ) BROKE. We have a lot of experience with wet-strength broke recovery that can be applied to problems you may encounter.

( ) CHEMICAL HANDLING. Use of liquid Alum and rosin size will simplify mill handling and may greatly reduce chemical costs.

( ) PITCH. Disperse with ACCOCEL® 741 Dispersant. Also effective in dispersion of ink, asphalt and other foreign matter.

( ) FILLER, FIBER RETENTION. Good retention of filler and fiber is promoted by the use of Sodium Phospho Aluminate.

*Trade-mark
®Registered trade-mark

## you name it

We can't begin to cover all the possible problems in this space. If you have any special ones not mentioned that we can help with, note them here.

( ) _____

_____

_____

# Woodyards Managers Report on Current Problems

IN AN EFFORT to survey the current situation regarding woodyards operations in the pulp and paper industry, we have contacted several of the leaders in this phase of pulp and papermaking.

Two representative replies to THE PAPER INDUSTRY are reprinted here. The questions asked of these men were:

1. What in your opinion are the most pressing problems confronting the woodyards superintendent, and

2. How would you suggest these problems be solved?

### *John G. Reamer, Woodyard Supervisor*

**Rome Kraft Co.**

The biggest problem we have encountered in our woodyard operation since mill start-up has been with our conveyors. Even though much thought and effort was put into the design of the conveyors, we have found that certain conditions exist that could not be foreseen prior to actual operation. Some of these difficulties arise from the unpredictable nature of wood and some to small weaknesses in design. Our solution has been to make changes as required.

Second problem in importance is that of unloading trucks in the best possible manner. We have designed special unloaders for our operation, and they do an excellent job. However, our system is not completely satisfactory due to the various types of trucks received. Our unloaders cannot be used in connection with certain trucks. Each mill seems to have its own particular method of handling trucks, with no two mills having the same installation. I don't believe there is any solution to the truck problem unless a standard pulpwood truck is used throughout the industry so that each mill can use a common unloading procedure.

It is our belief that many problems of the woodyard superintendent can be helped or solved through meetings of engineers, manufacturers and superintendents, in which free interchange of ideas and problems could be discussed. This is done in many phases of the paper industry but to our knowledge is not being done in the woodyard.

### *Paul W. Fuller, Superintendent Mill Wood Dept.*

**Oxford Paper Co.**

Problems confronting a woodyard superintendent are many and varied and involve all facets of the operation—men, materials and machinery. Many of the problems involving materials, machinery and methods of operation are constantly discussed at most conferences and in trade journals. The one area that seems to be consistently omitted: problems of the labor force.

Problems involving labor are becoming more prevalent and critical with each passing day. The basic causes behind this trend seem to be:

1. Seasonal fluctuations in employment opportunities discourage the more qualified employee from seeking employment in this phase of the industry and force management to make a selection from the less desirable portion of the available manpower.
2. Technological changes call for a higher-quality employee than was formerly required.
3. Increased quality standards require a higher degree of skill on the part of operators.

The above factors create problems that are typical of those resulting from inadequate personnel: low production, high accident rates and other millstones of inefficient operation that result in higher costs.

After an extensive evaluation of these problems, Oxford decided several months ago to attempt to improve conditions by creating a program designed to accomplish the following:

1. Permit a better means of selecting higher-quality employees;
2. Train new employees to work more safely and efficiently;
3. Retrain individuals presently employed to work more safely and efficiently, and
4. Train the foreman to carry out the above functions and his other duties in a more efficient and effective way.

The project was called, "Job Instruction Training Program." The specific objective was to instruct the foreman in the preparation of job instruction training sheets for each occupation in his department. This would assist him in training his men to make the most effective use of themselves, their machines and their materials.

The project was broken down into basic elements and carried out as follows:

1. Planning Meeting—The supervisor, foreman, methods engineer, assistant safety manager and training manager met to decide upon the functions, duties and areas of responsibility of each person taking part in the program. It was agreed that each man should coach the foreman in his own specialty.
2. Evaluating the Job—Each step of every job was evaluated in terms of (a) what is to done; (b) why is it to be done; (c) when is it to be done; (d) where is it to be done; (e) who should do it, and (f) how should it be done.
3. Recording the Information—A form was prepared for recording the information.
4. Teaching the Job—The job instruction sheet is so prepared that the foreman can teach the man to do each step of his job following a What-to-Do, How-to-Do-It outline.

This program that has proven of such value in solving our problems has recently been adopted on a mill-wide basis. In summary, this is what it accomplishes:

1. Each job is evaluated in terms of its physical, educational, knowledge and skill demands to serve as a basis for selecting suitable employees.
2. Through proper training we can make the most effective use of the men presently employed in the department.
3. Properly-trained men will make more efficient use of materials and equipment.
4. Finally, a well-trained man operates safely without danger to himself, others, the machinery or the product.

Each man is well paid to fulfill all the duties of his job. If we determine what these duties are, the most effective way to perform them and carefully select and train the man to do it properly, the majority of our problems will be solved.

(Note: A semi-documentary film strip and accompanying script has been prepared to train the supervisors and foremen to carry out this program for Oxford Paper.)

# for ANY PULPWOOD HANDLING PROBLEM

Handling Jackstrawed Pulpwood with slings.

Piling with tongs.

Piling with a grapple.

YOU can answer *any* kind of a pulpwood handling problem with a Northwest. Extreme versatility, positive traction while turning as well as when going straight ahead, a wide range of boom hoist equipment to choose from, permit you to have just the right set-up for handling pulpwood in any condition.

Your Northwest can be equipped with grapple, sling, grabs or tongs. It will handle dry, wet or frozen pulp—whether it is piled, racked, bundled or jackstrawed.

You can have your Northwest on crawlers or on several types of wheel mountings to meet your travel requirements.

If you are loading in the woods you will find Northwest steering with positive traction on both crawlers at all times to be a major asset. It takes you where other machines have difficulty. It gets you there—and more, it gets you back.

If you are using locomotive cranes, replacing them with a Northwest will bring you a new speed in loading and materially improve your storage facilities and mill capacity. Plan to modernize with a Northwest. Let us give you more details in line with your problems.

NORTHWEST ENGINEERING COMPANY
1516-2 Field Bldg., 135 South [illegible]alle Street, Chicago 3, Ill.

# NORTHWEST

*The Crane That Can Anywhere*

10 to 50 TONS

LG-1-10

# Lab tests prove new overwrap gives highest gloss at low cost

*Readings taken with Photovolt Glossmeter show new coated paper matches gloss of laminated transparent stock.*

**Laboratory tests prove** that the new overwrap coated with A-C* POLYETHYLENE-wax blends has a gloss rating equal to that of laminated transparent stocks. Yet it costs 40 to 50% less!

**Despite this remarkably** low cost, the overwrap coated with this A-C POLYETHYLENE blend is scuff-resistant, has a smooth plastic feel and is equal in quality of appearance to the more expensive types.

**Paper converters using** A-C POLYETHYLENE find that this low-molecular-weight, low-viscosity polymer improves the stock in many ways without major cost increases. Food wrappers are not affected by high food temperatures, nor will they crack or lose gloss at freezing temperatures. Packages stay sealed; the overwrap *does not wrinkle*, as transparent types do.

**Write for information** and samples of paper coated with blends containing A-C POLYETHYLENE or ask your paper converter for details.

*Trade-mark

CHEMICAL PROGRESS WEEK-APRIL 23-28

A-C* Polyethylene

**SEMET-SOLVAY PETROCHEMICAL DIVISION**
Allied Chemical & Dye Corporation
Room No. 573
40 Rector Street, New York 6, N. Y.

Please send me information and samples of the new overwraps containing A-C POLYETHYLENE.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

# HORTON DIGESTER

# ARKANSAS BOUND

Digester, 10½-ft. by 40½-ft., designed for a working pressure of 150 lbs. per square inch at 650 deg. Fahr. The vessel was X-rayed and stress relieved in CB&I's Birmingham plant.

● This Horton® digester is ready to leave our Birmingham, Alabama, plant and head for the Crossett Paper Mills at Crossett, Arkansas.

Digesters such as this, built by CB&I, are in operation around the world . . . as are blow tanks, liquor tanks, accumulators, Marx Savealls, etc. We have complete facilities to design, fabricate and erect such structures to your most exacting specifications.

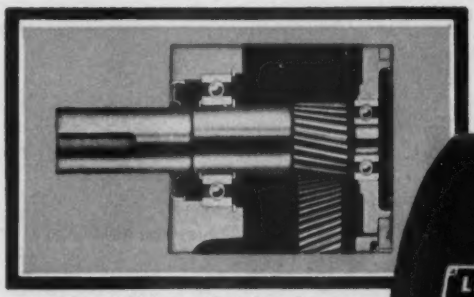
Investigate CB&I when you plan welded steel plate structures for your plant. Write our nearest office for information, estimates or quotations.

CB&I

**Chicago Bridge & Iron Company**

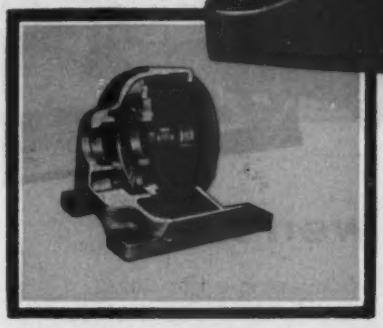
Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • Tulsa
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

# From Link-Belt . . . NEW, precision-made In-Line Helical Gear Drives



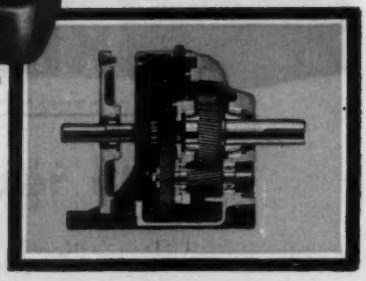
**RIGIDITY** of high speed shaft and pinion is provided by straddle-mounting—of extreme importance in coping with shock, reversing and heavy loads.

**HARDENED GEARS** are produced on modern hobbers and are accurately shaved. This provides the ultimate in gear performance.



**OIL-TIGHT DESIGN** is provided by one-piece, close-grained cast iron housing with effective oil seals.

**ONE LOW-SPEED GEAR SET** per drive size and maximum accessibility of all operating parts simplifies maintenance.



WHEREVER you need dependable speed reduction up to 118 hp . . . and strength and long life are major factors — new Link-Belt In-Line Helical Gear Drives are specifically equipped for the job. In their smooth, corrosion-resistant, husky cast iron housing . . . hardened, precision, double or triple reduction gear sets accurately provide required speed.

Space requirements and layout problems are minimized by locating input and output shafts in the same horizontal and vertical planes. Design of drive permits the addition of integral, positive-locking backstop at any time.

Get the full story on these advanced new drives, ratios 6.2:1 to 292:1, in 16-page Book 2651. It's available from your nearby Link-Belt office or authorized stock-carrying distributor.

**LINK-BELT**

**ENCLOSED DRIVES**

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,000

# KELCO ALGINATES IMPROVE PRINTABILITY

With size press or calender stack application of Kelgins or the Kelsizes, you surface-treat your paper and board to secure the precise surface characteristics for all press requirements.

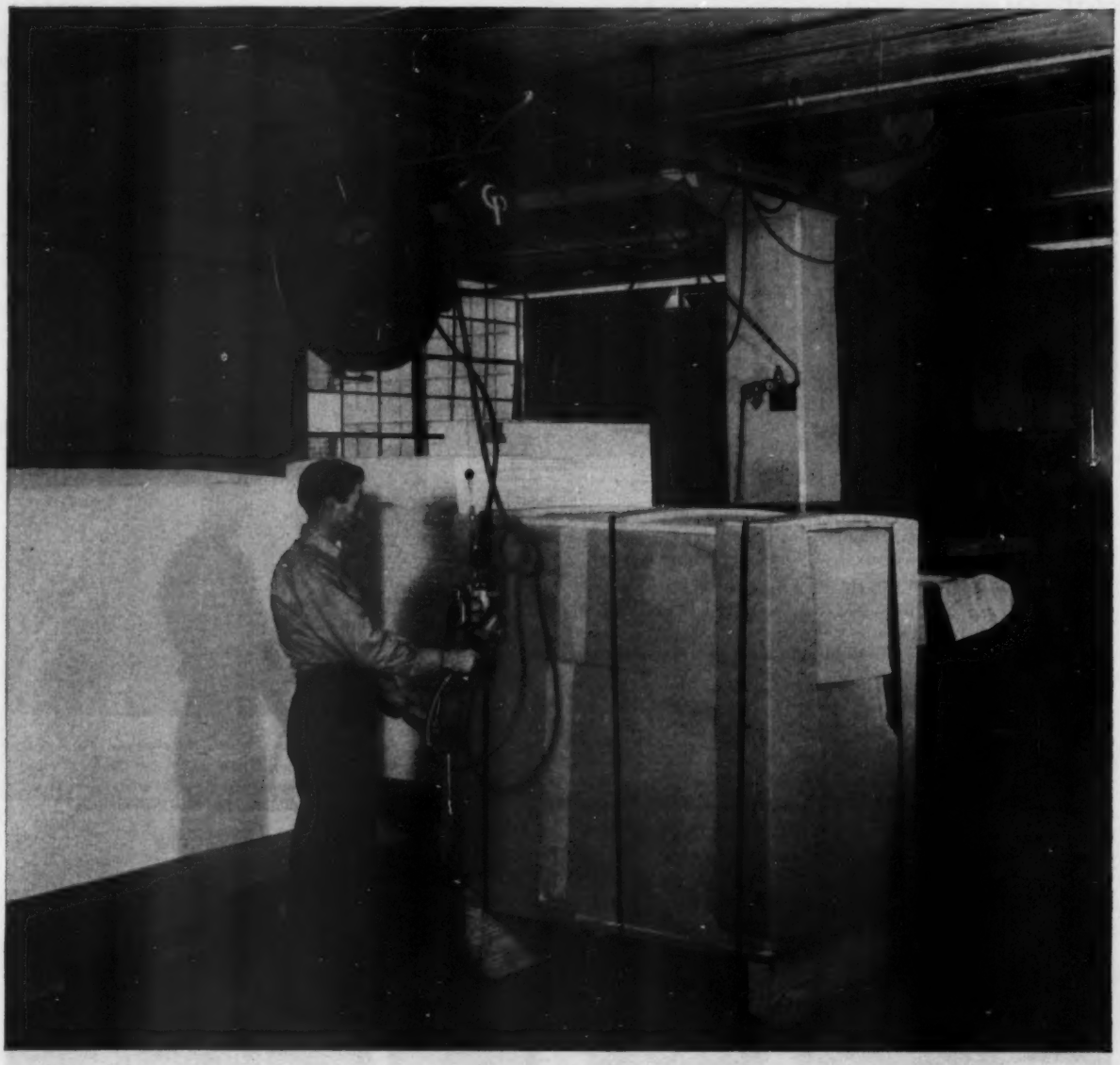
You get just-right surfaces for brilliant mottle-free high gloss, velvety semi-gloss, or clean, sharp flat-line and halftone printing.

You use far less ink, yet produce brighter, clearer printing with improved uniformity, color yield and appearance. Ink films bond quickly and completely to the sheet, controlling costly and messy rub-off or offsetting.

Test prove for yourself high gloss, semi-gloss, or flat printing produced by use of these versatile Kelco alginates: Kelgin XL, Kelgin LV, Kelgin, Kelsize S, Kelsize. For full information about the measurable advantages you derive with the Kelgins and Kelsizes, write your nearest Kelco regional office.

KELGIN XL · KELGIN LV · KELGIN · KELSIZE S
KELSIZE

KELCO COMPANY



# Fast new way to strap paper skids

Strapping paper skids is fast and easy with a setup like this. The bridge crane gives mobility to the strapping equipment, and obstruction-free working space on the floor. Signode's new AP-34 air-powered strapping machine applies strap almost effortlessly, in seconds. This Signode design setup makes skid strapping a much more efficient and easy operation. It saves important time and, in addition, frees valuable floor space. A Signode field engineer will be glad to work with you to develop complete strapping stations in your plant, tailored to your needs. Let him help you save time and money now. Write:

**SIGNODE STEEL STRAPPING CO.**

*2632 No. Western Avenue, Chicago 47, Illinois*

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

# CHAIN BELT answers your wood handling problems...

## BY GIVING YOU ONE SOURCE FOR ALL YOUR DRIVE CONVEYING OR ELEVATING NEEDS!

For the long haul, Rex Belt Conveyor Idlers and Chains carry barked pulp logs to the chipper. These conveyor components are big favorites because of their lasting qualities and low maintenance.

### COMPLETE HANDLING SYSTEMS...

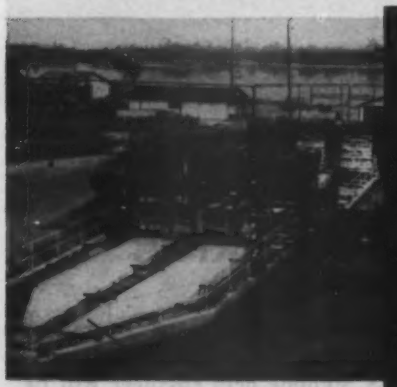
Not only does CHAIN Belt make chains, belt idlers, bearings for your power transmission, conveying or elevating needs ...it also designs *complete* wood handling systems!

And why not? CHAIN Belt has over 50 years' experience supplying products and solving difficult materials handling problems for sawmills...pulp mills...softwood, hardwood, plywood plants...and other forest products industries.

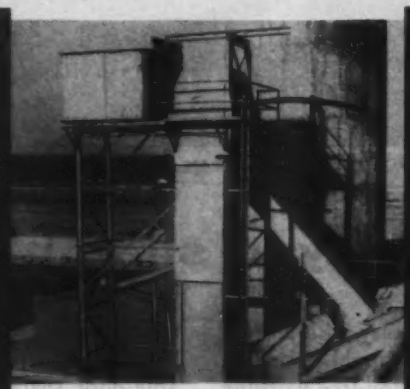
Shown here are but a few examples of handling systems that CHAIN Belt has designed or supplied components for—systems that have paid big dividends in time saved, increased capacity and lower costs.

This service of CHAIN Belt is at your disposal. It includes top-flight engineers, draftsmen and manufacturing facilities to handle every type of wood handling problem.

For complete information, contact your local CHAIN Belt District Office or write CHAIN Belt Company, 4714 W. Greenfield Ave., Milwaukee 1, Wis.



Three chain and bucket grit collectors in this paper mill log handling flume prevent floating bark, dirt and other debris from clogging and damaging water pumps. These CHAIN Belt Grit Collectors save costly repair and maintenance to the pumps and keep the closed-circuit flume system working at top efficiency.



This Rex Wood Chip Elevator is especially designed for handling chips up to the top of the digester or to the screens. Special steel buckets and a high-speed belt provide capacity to handle from 12 to 15,000 cubic feet per hour! This unit assures smooth, steady flow of materials at minimum maintenance and operating cost.

In the mill, this Rex Slat Conveyor is used for feeding barked logs to the grinders. It is 66 inches wide on 228-foot centers. The system has a capacity of 30 cords per hour. Teamed with company and consulting engineers, CHAIN Belt developed this system that has many new innovations to speed production, cut costs.

## CHAIN BELT COMPANY

*LEADERSHIP... through creative engineering*

MILWAUKEE 1, WISCONSIN

Installation of Koppers Electrostatic Precipitator at P. H. Glatfelter Co. plant, Spring Grove, Pa.

# In Salt Cake Recovery at Glatfelter Paper Mill, Koppers Precipitator Exceeds Guarantee by 25%

Although tested under overload conditions, a Koppers black-liquor Electrostatic Precipitator which was installed to clean gases from a new recovery boiler at the P. H. Glatfelter Company, Spring Grove, Pa., exceeded residual specifications by 25%.

Koppers guaranteed a residual of only .10 grain per cubic foot, when the unit was cleaning gas—at the rated gas volume—with an inlet dust load of 2½ grains. During the test period, actual dust load varied as high as 3 grains; yet the Koppers unit cleaned gas to an average residual of .07 to .08 grains—exceeding guarantee by 25%.

Besides keeping your community cleaner, healthier, doing a constant public relations job for you, Koppers Electrostatic Precipitators can save you money by reclaiming valuable materials. Why not use the coupon below to get in touch with Koppers about *your* nuisance or recovery problem?

KOPPERS

**ELECTROSTATIC PRECIPITATORS**

**METAL PRODUCTS DIVISION • KOPPERS COMPANY, INC. • BALTIMORE 3, MD.** This Koppers Division also supplies industry with Fast's Couplings, American Hammered Industrial Piston and Sealing Rings, Aeromaster Fans, Gas Apparatus.

*Engineered* Products Sold with *Service*

**KOPPERS COMPANY, INC.,** *Electrostatic Precipitator Dept.,* **4604 Scott St., Baltimore 3, Md.**

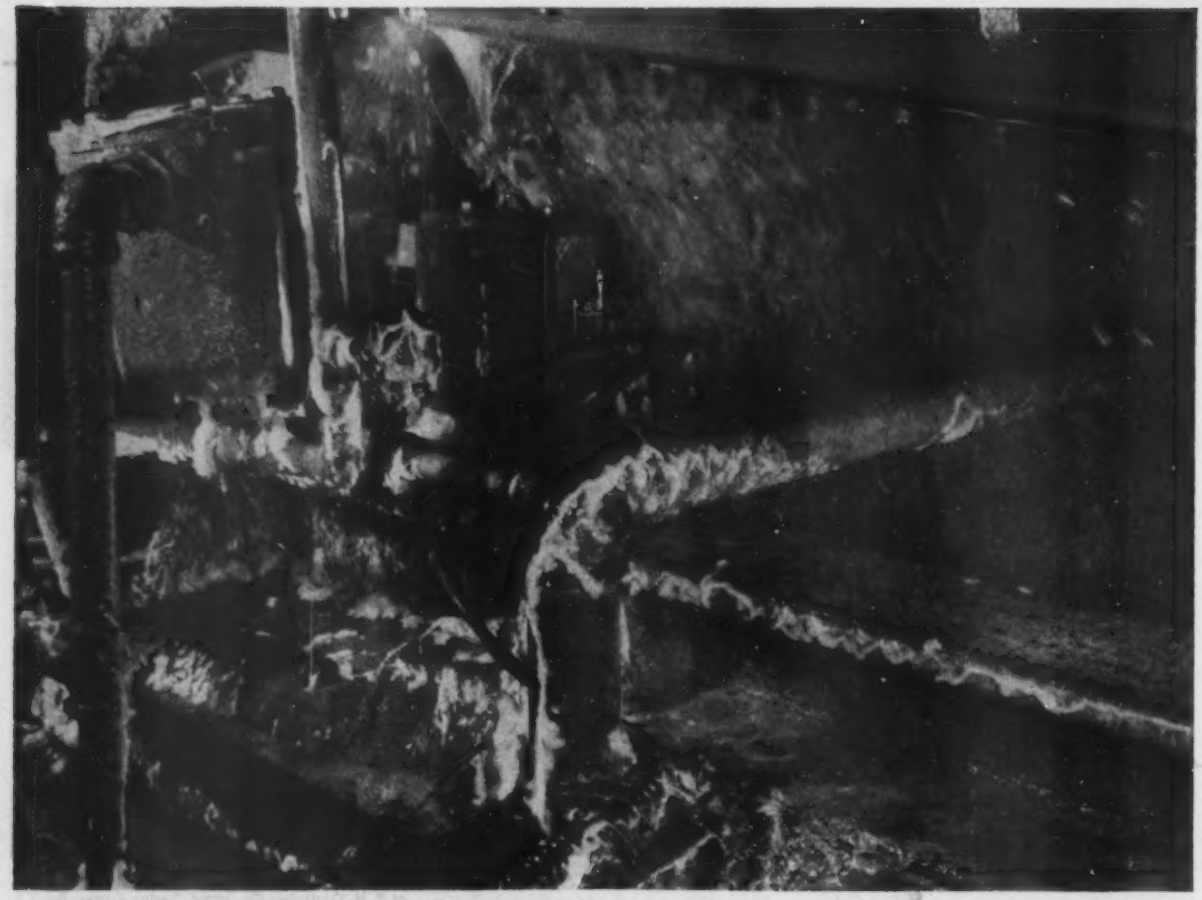
Gentlemen: I am interested in a review of my gas cleaning problem.

Name.....

Company.....

Address.....

City..... Zone..... State.....



**A GOOD DOCTOR is operating here —**

**a Lodding Hydraulic Oscillating Doctor**

**no valve mechanism, fluid reservoir or pump required.**

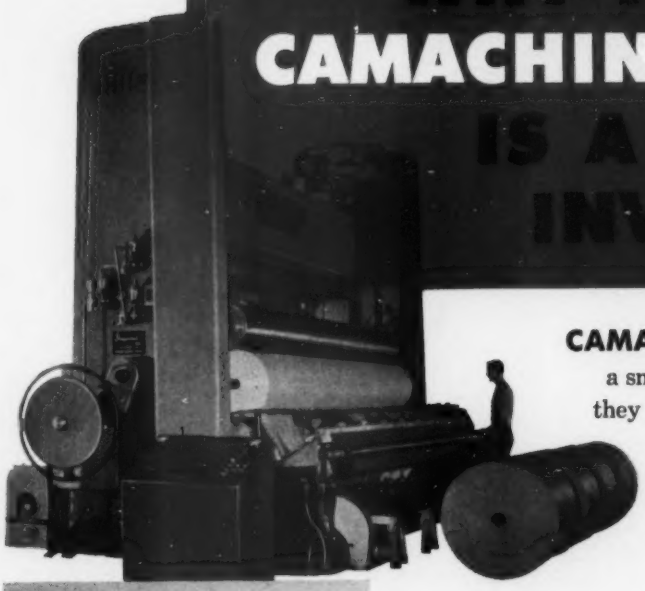
**Banish the danger of scored rolls.**

**Be safe — specify LODDING.**

**LODDING ENGINEERING CORPORATION**

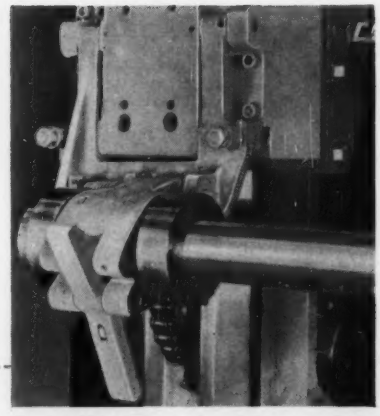
**WORCESTER • MASSACHUSETTS**

# WHY THE CAMACHINE IMPERIAL IS A SOUND INVESTMENT...

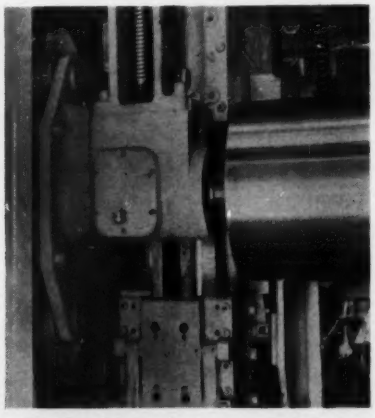


**CAMACHINE IMPERIAL** winders represent only a small fraction of the total cost of the mills which they serve. Yet, the IMPERIAL can protect profits on your entire plant operation by assuring matchless performance at the winding end of even the fastest paper machine. Exceptional speed, dependability, ease-of-operation and high quality of output are built into the IMPERIAL. Following are a few of the many important new features of IMPERIAL winders.

**Centralized Controls** . . . All hydraulic and pneumatic controls and pressure meters are concentrated in one conveniently designed control station. *What does this mean to you? Easier operation, plus the fast, dependable control so necessary when running at high speeds.*

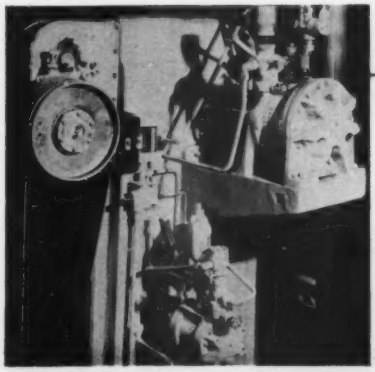


**Rewind Shaft Bearing Holders** . . . The rewind shaft bearing holders are "spring cushion" mounted both vertically and horizontally to absorb shock and strain caused by bent shafts. *To you this means smoother action—prolonged shaft and holder life.*



**Riding Roll Suspension** . . . Provisions in the mounting design permit the riding roll to tilt 1" lengthwise, providing optimum pressure and torque distribution. *Finished rolls are wound with uniform density . . . perfect for shipment or further processing.*

**Hydraulic Lifts** . . . Hydraulically operated motors raise and lower both the riding roll and rewind shaft bearing holders, quickly, with finger tip control. *Your profits are protected because costly downtime between sets is kept at a minimum.*



AA-316

**THE CAMACHINE IMPERIAL** provides ability to stay well ahead of today's fastest paper machines...with reserve capacity to meet tomorrow's increased demands. Write for complete information.

**CAMERON MACHINE COMPANY**

61 Poplar Street, Brooklyn 1, N. Y.

We look forward to greeting YOU at—

**37TH ANNUAL CONVENTION**

AMERICAN PULP and PAPER MILL SUPERINTENDENTS ASSOCIATION

JUNE 12 to 14
LAKE PLACID CLUB
ESSEX COUNTY, N.Y.

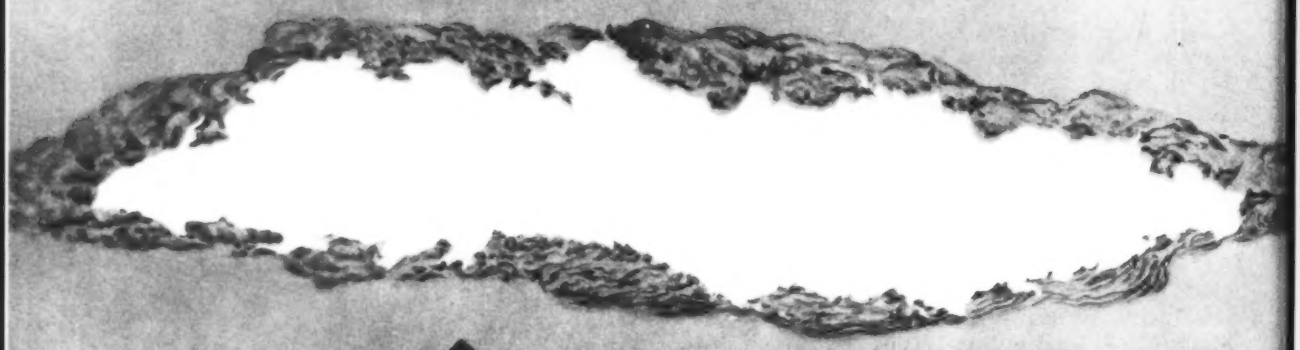
DETROIT PUBLIC LIBRARY

# 2-point slime control plan

## first scientific solution to the slime problem

**Add a bacteriologist or chemist to your staff without cost!**

**1** The Technical Service Representative from United States Movidyn Corporation is university-trained, and thoroughly experienced in slime control. His job is *service* rather than selling, and he'll work with you for as long as he's needed. Using the compact mobile laboratory carried in his car (or your mill laboratory) he'll analyze and solve your slime problem under actual operating conditions—and at no additional cost to you!



**One product can solve your slime problem economically!**

**2** No need to alternate with any other slimicides! SLIMODYN contains three powerful heavy metal toxicants for use in most white water systems. MICRODYN is specially formulated for application in paper mills where mercurials are objectionable. SLIMODYN and MICRODYN, being completely dispersible in water, are suitable for spraying after washups, and adsorb readily on surfaces to build a residual germicidal activity. They are relatively unaffected by changes in pH; will not shorten wire life or cause foaming.

For complete information, contact

UNITED STATES **Movidyn** CORPORATION

863 N. Orleans Street
Chicago 10, Illinois
Telephone WHitehall 3-1530
Cable: MOVIDYN

# Powell Lubricated Plug Valves

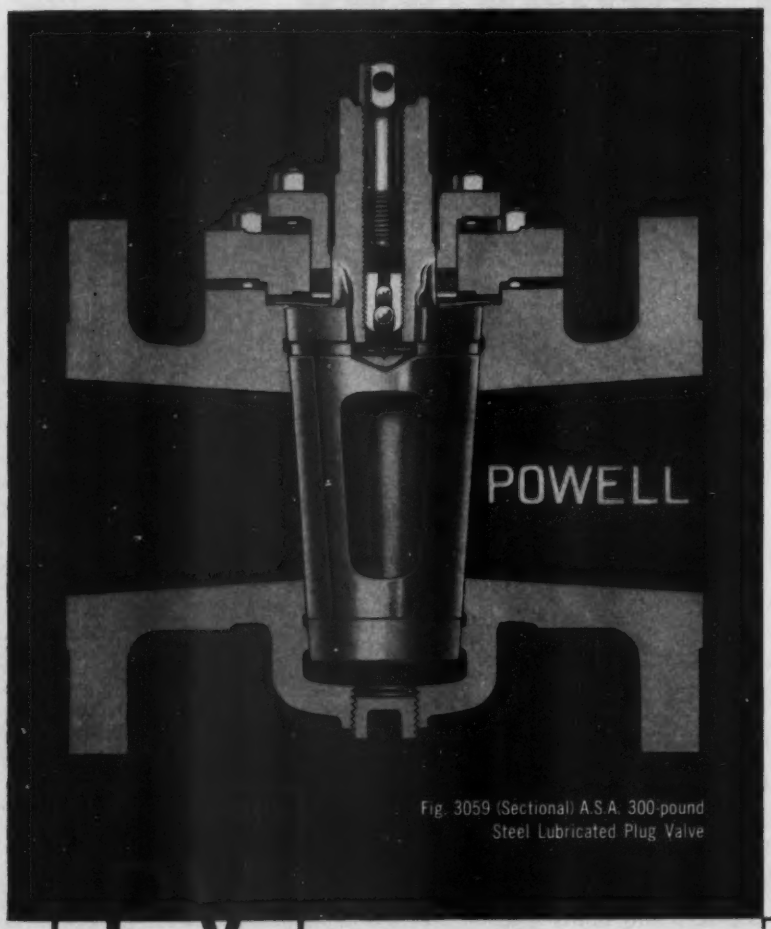



Fig. 3059 (Sectional) A.S.A. 300-pound Steel Lubricated Plug Valve

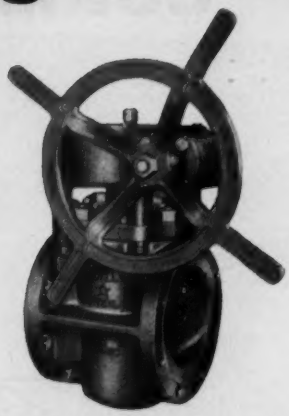


FIG. 1559G—150-pound Steel Lubricated Plug Valve. Gear operated

FIG. 2200—175-pound W.O.G. Semi-Steel Lubricated Plug Valve

VERIFIED

Powell Lubricated Plug Valves maintain the 110-year tradition of quality and precision. Only the finest available materials are used. And painstaking quality control is rigidly enforced through each and every step of manufacture.

*Valve users who want one source of supply for lubricated plug as well as all types of bronze, iron, steel and corrosion-resistant valves will want full details on Powell Lubricated Plug Valves.*

For example, features include quick and positive operation—just a quarter-turn to open or close. Lubricant grooves surrounding each port provide a positive seal when the valve is closed. In an open position, seating surfaces are not exposed. Available in Steel and Semi-Steel through distributors in principal cities.

For full details, write for the new PV-4 Catalog on Powell Lubricated Plug Valves. Just fill out the coupon and mail. Of course there's no charge, no obligation.

**THE WM. POWELL COMPANY**
**2525 Spring Grove Ave.**
**Cincinnati 22, Ohio**

Gentlemen:

Please send me a copy of your PV-4 Catalog on Powell Lubricated Plug Valves. It is understood that there is no cost, no obligation.

*name*_____

*title*_____

*company*_____

*city*_____

*zone*_____ *state*_____

*The source of supply for all valve needs!*

# POWELL VALVES...110th YEAR

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

# "coating-conscious"?

# use Clinton® starches

For over 30 years, Clinton starches and dextrins have helped satisfy "coating-conscious" paper makers.

Clinton is just as interested in coatings as you are. Why? Because a coating — *any coating* — is no better than the adhesive that holds it together and binds it to the paper. Clinton starches and dextrins do an admirable job in both respects.

And if it's "size-satisfaction" you're looking for, Clinton starches are sure to measure up to your most hopeful expectations.

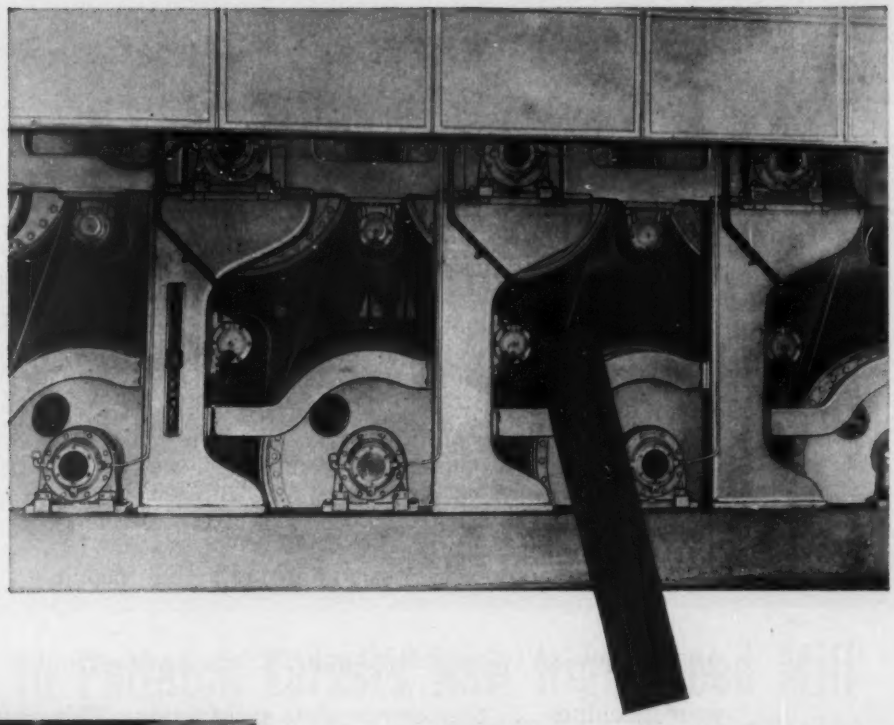
*. . . and remember* : technical service in connection with your specific problems is available upon request

**Quality products**

FROM THE WORLD'S CORN CENTER

CLINTON

CLINTON FOODS INC.
*Corn Processing Division*
CLINTON, IOWA



# a Black-Clawson design feature

## "open window" dryer framing

This modern, functional front side framing designed by Black-Clawson provides an "open window" for excellent air circulation and maximum access to the up-traveling sheet.

It's easy and safe for operators to handle felts, felt rolls and doctors. The open construction enables the operator to blow out broke either to the front or back side.

The rigid box type pedestals support top dryers and felt dryer framing. Bottom dryer bearings rest on the base plate.

Felt roll bearings are side-mounted on the upright pedestal rather than behind the frame to provide accessibility for lubrication, maintenance and roll removal.

Open backside framing with enclosed gearing provides safety, accessibility, free air circulation and cleanliness. "Open window" dryer framing is one of hundreds of advanced paper machine designs produced by the creative engineering of Black-Clawson.

The BLACK-CLAWSON Company

PAPER MACHINE DIVISION • WATERTOWN, N. Y.

## . . . to be useful to you

Our way of doing business is simple and, we think, sensible. Our aim is to work with *you* to find the *best* answers to *your* problems of felt application and performance.

That starts with intelligent field representation . . . the ability to *understand* your problems . . . then, to interpret them correctly to our research, design and production people.

And our job isn't done until Appleton felts have performed on your machines . . . to your complete satisfaction. This way of doing business, we believe, makes us most useful to you.

FAMILY AFFAIR—*Although we take pride in our modern, precision equipment, it takes more than machines to make felts you can depend on. It takes craftsmen, too . . . like the Schwandt brothers, Carleton and Milton, whose combined 37 years of experience and devoted skill pay off for you on the paper machine.*

**Appleton felts**

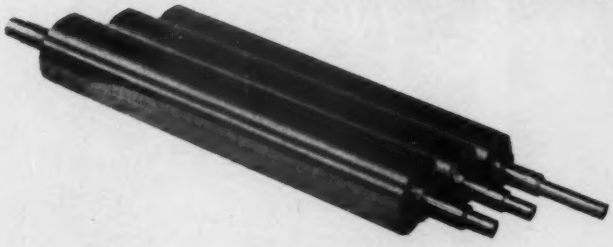
1881 75 years 1956

**APPLETON WOOLEN MILLS**

*a working partner with the paper industry*

APPLETON, WISCONSIN

## In Potlatch Forests' New High-Speed Mill



# WELDCO ROLLS

## Help Increase Production Of Bleached Kraft Paper

Today's high-speed kraft paper production calls for the finest, newest, most efficient equipment. So when Rice-Barton Corp. designed Potlatch Forests' new 196" machine, WELDCO Stainless Steel Roll Covers were specified for the Wire, Wire Stretch, and Breast Rolls.

You'll find WELDCO—Covered Rolls in many other mills, too, because they offer maximum corrosion-resistance, have superior wettability, reduce friction, increase felt life, and lessen wear on fourdrinier wires. They give years and years of economical service, with a minimum of maintenance.

Both new and old rolls can be covered with Stainless Steel, Monel, Nickel, Inconel, or other alloys, through the patented WELDCO "Pressure Welding" process. For your next machine — whether new or reconditioned — be sure to specify WELDCO Rolls. Ask your paper machinery builder about them, or contact . . .

WELDCO

**THE YOUNGSTOWN WELDING & ENGINEERING COMPANY**

3715 OAKWOOD AVENUE · · YOUNGSTOWN 9, OHIO

# Appleton Twins For Dual Economy

A new Appleton supercalender to increase production. A modern Appleton rewinder for more speed. Team them up for *twice* the efficiency to cope with today's higher costs.

Appleton supercalender illustrated: 150" 12 roll, has shaftless unwind arrangement and automatic roll handling from elevated storage platform. Operates at 1800 f.p.m.

Appleton rewinder illustrated: 150" 2 drum, also ruggedly built, with low center of gravity to assure vibration-free operation. Operates at 3500 f.p.m.

APPLETON MACHINE COMPANY
APPLETON WISCONSIN

CUSTOM BUILDERS OF PULP, PAPER & TEXTILE MACHINERY · CALENDERS · FINISHING ROLLS · REWINDERS · SCREENS · DECKERS

# Can she depend on you?

This lady is holding the bag...perhaps it is yours. Whoever is responsible for the adhesive job should investigate the properties of Globe dextrines.

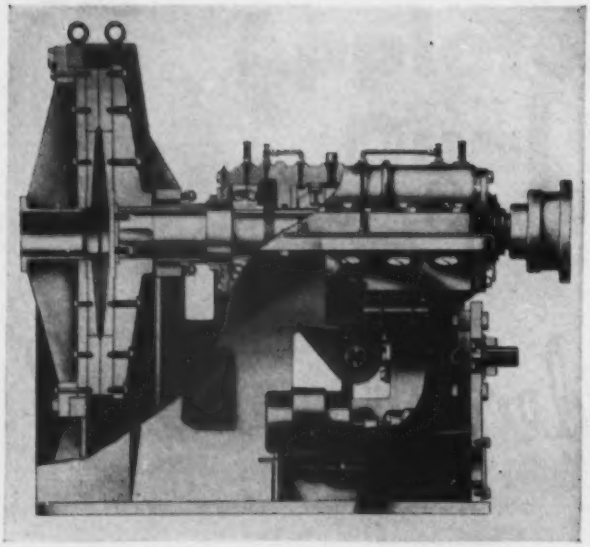
Paper converters find Globe dextrines and gums provide an excellent bonding medium. The increased adhesiveness of the low-viscosity Globe dextrines is popular for bag manufacture, wherever a lardy, heavy paste is required. Other, more highly converted types of Globe dextrines and gums are extensively used for their more fluid, tacky paste.

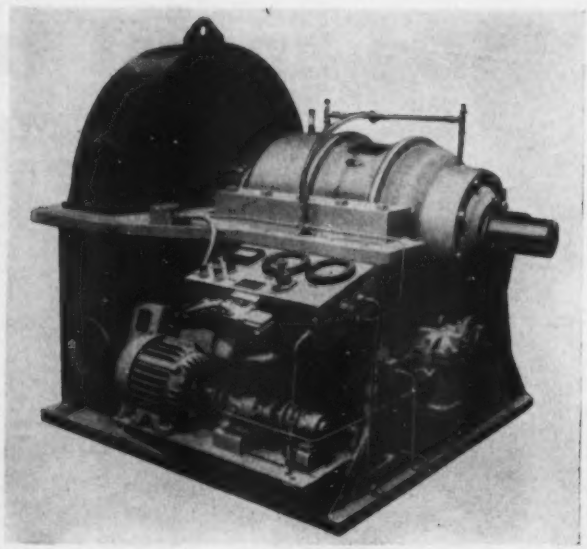
*Ask the man from Corn Products,* he can help with product information and engineering assistance. Whatever your paper-making problem, he will be able to supply you with the technical assistance you require.

## Globe® Dextrines and Gums

**Corn Products Refining Company**
**17 Battery Place, New York 4, N. Y.**

**Corn Products has a complete line of starches for every use in the paper industry:**
**AMIJEL · EAGLE · FOXHEAD · GLOBE · HERCULES · GLOBE DEXTRINES · CORAGUM · LAM-O-DEX**





# THE SUTHERLAND BALANCED FLOW REFINER*

## *POUND for POUND and DOLLAR for DOLLAR—the WORLD'S BEST*

Advantages of the Sutherland Balanced Flow Refiner may be summarized as follows:

**Consistent Stock Quality** is maintained by the constant pressure applied through the hydraulic control system. The single rotating disk with its simple adjustment allows the operator to apply the exact amount of power required and to maintain a uniform power load.

**High Stock Quality** is maintained through the Balanced Flow Principle. A check ring at the periphery of the disks maintains a steady flow of pulp between the disks—the only area where effective refining action occurs.

**Low Installation Costs** are realized through simplified designs and the ease with which the Balanced Flow Refiner is placed in service.

**Low Operating Costs** are realized by the ease of maintenance, long disk life and quick disk changes when needed. For example, there is only one packing gland, and that is readily accessible.

The new refiner has been on test on southern kraft pulp since early December on grades ranging from 30# paper to 33# board. It has demonstrated marked capabilities both for high capacity and low power consumption. Operators have found it simple to operate and results can be readily reproduced by merely resetting the refiner to the same pressures and power.

*The Sutherland Balanced Flow Refiner is establishing new standards of quality and economy for the pulp and paper industry. Write today for the new Sutherland brochure with full details.*

*Patents Pending

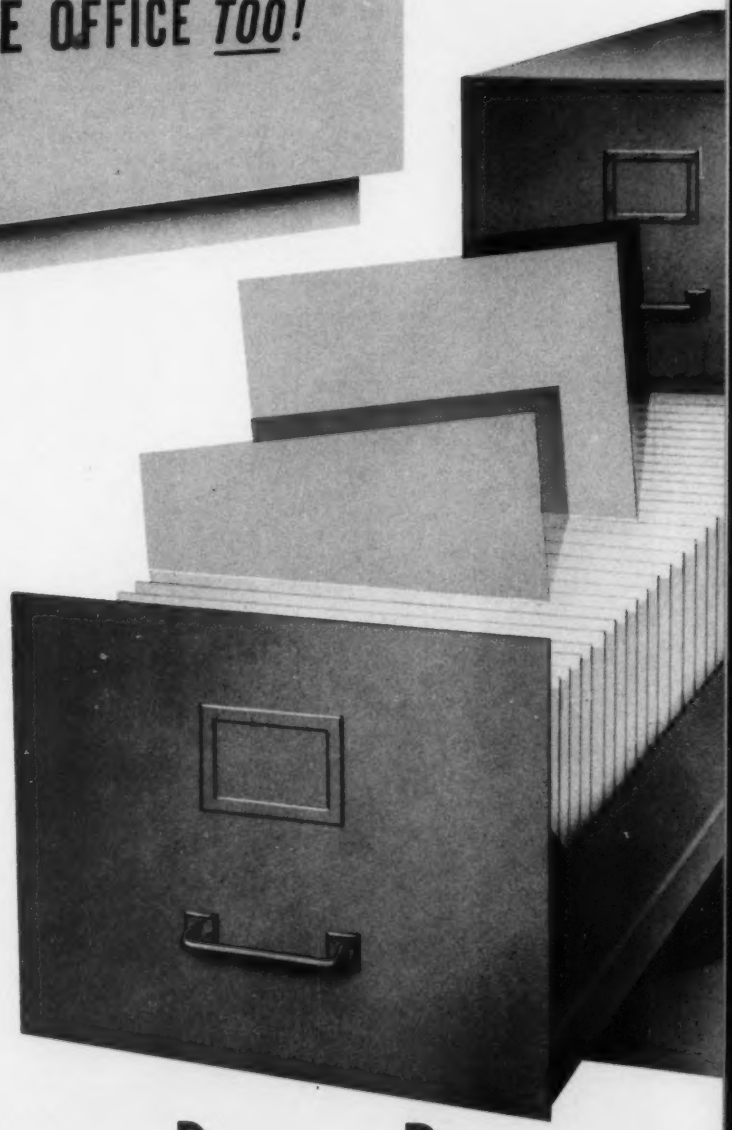
4-401

SUTHERLAND

REFINER CORPORATION
TRENTON 3, NEW JERSEY

AIR MAIL

# FOR AIR MAIL SPEED *INSIDE* THE OFFICE *TOO!*



EFFICIENT MANAGERS
AGREE ON
TIME-SAVING

# COLORED BOND

It commands a premium because it cuts the cost of "paper work".

National Aniline offers many dyes from which to create pleasing tints of Yellow, Buff, Salmon, Golden Rod, Pink, Blue, Green and Grey.

For dependable recommendations of dyestuffs which produce attractive shades with a minimum of two-sidedness, contact our Service Laboratories.

## *National Aniline* Paper Dyes

**NATIONAL ANILINE DIVISION**
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Los Angeles San Francisco Portland, Ore. Greensboro Chattanooga
Philadelphia Charlotte Richmond Atlanta Chicago Columbus, Ga. New Orleans Toronto

# Woodpulp PLUS

Our goal is to obtain maximum utility and value from each harvested tree. Diversity of processing is the key to whole-crop wood utilization. The plants of Weyerhaeuser Timber Company convert the tree's raw materials into numerous indispensable products.

Woodpulp is one of the chief products from our forests—uniformly high-quality pulp is supplied on a reliable long-term basis to all of the woodpulp-using industries from the mills of Weyerhaeuser Timber Company.

**WEYERHAEUSER**

PULP DIVISION

# New developments in fourdriniers

**▶ Recent developments in fourdrinier construction have made a tremendous impact upon the productivity of the paper mills. Further major changes are anticipated over the next five years**

THE PANEL DISCUSSION on new fourdrinier developments at the recent 41st annual TAPPI meeting dealt with recent improvements and the elimination of various barriers in the constant trend toward higher machine speeds and greater productivity.

Taking part in the discussion were: D. W. Curtis, Beloit Iron Works; W. S. Corbin, the Black-Clawson Co.; C. E. Hill, Pusey & Jones Corp.; C. S. Adams, Rice Barton Corp., and A. A. Lowe, Sandy Hill Iron & Brass Works.

While there is no doubt that real progress has also been made in tackling basically different approaches to the design of paper machine construction, not disclosed at this meeting, a few opinions were expressed to show what changes the fourdrinier might undergo in the next 5-10 years.

The following is a resume of the new developments on the fourdrinier as presented by the panel members:

### *Developments at the inlet (Beloit Iron Works)*

▶ The recent development of air-loaded headbox and nozzle-type inlets, direct connected to the fan pump, has resulted in (1) uniformly active flow from inlet to slice (without dead spots), (2) compactness to save building space and (3) self-cleaning action, which eliminates dirt and slime accumulation.

▶ Since on most machines stock flows directly from the fan pump to the stock inlet, there is need for an efficient flow spreader on the headbox. This has been accomplished through (1) the addition of recirculating elbows at the ends, (2) maintenance of optimum ranges in flow velocities, (3) use of sloping circular passages in place of rectangular shapes, and (4) use of a properly designed rectifier roll in the throat.

▶ The problems in connection with the presence of air in the stock flow (causing fan pump variations, flow variations across the machine, retarded and poor formation) have been largely eliminated through proper design of wire, seal pits, stock piping runs, and stuff boxes as well as by eliminating all waterfalls and cascades in the system.

▶ Beloit engineers believe that the modern stock inlet no longer limits machine speeds in the range up to 3000 fpm, and that changes in the next five years will be confined to (1) tailor-fitting each inlet more specifically for the grades to be run, (2) reducing the approach flow time on heavily-loaded grades, and (3) maintaining the maximum amount of fiber activity without introducing cross-currents and eddies.

### *Inlet and slice (Rice Barton Corp.)*

▶ A new unit which will go into operation later this year incorporates the following basic objective in its design: the residual fluid space in the open box-type inlet has been reduced to an absolute minimum to prevent undesirable stagnation, by automatically controlling a by-pass around the fan pump to maintain the desired inlet pressure and by accurately maintaining the selected fan pump speed. The latter can be achieved through variable speed control of the fan pump to match the total dynamic head requirement.

▶ The contour of the flow path from fan pump to slice is so designed that most of the air will be caught in special traps, and any residual air will move swiftly onto the wire. The bottom contour, having a continuous upward slope, prevents the settling out of solid additives.

▶ The flow spreader is designed to spread the flow uniformly in a controlled manner and independently of machine width or stock velocity.

### *Inlet developments (Sandy Hill Iron & Brass Works)*

▶ In the conventional low head and low speed head box, new interest is shown in the advanceable and retractable apron board and the flat top lip, which may be nearly parallel or at a 45° angle to the apron board.

▶ Improvements made on the conventional head box are (1) the multiple ducts leading from the approach flow box to the head box, (2) a screen collecting box added as an integral part of the head box, and (3) provision for recirculation of excess gallonage through the head box to prevent flocculation.

Also, in an attempt to achieve the perfect approach-to-slice combination, the screen and the approach flow box, etc., have been eliminated — to reduce dimensions of the head box to a minimum.

▶ It is suggested that the uniform profile across the machine in papermaking is affected by a change of gallonage or a change in the rate of discharge (acceleration) ahead of the slice.

The success of the air capped pond could derive from the enormous reduction in acceleration in this area, since the velocity of the stock flow through the air capped pond must of necessity be greater than that in an open pond.

▶ The piping from the pump to the head box has been so designed and installed as to reduce agitation and turbulence of stock flow to such an extent that valves and agitation quieting areas can be eliminated.

▶ The size and relation of one pipe to another in the manifold introducing stock into the head box or head box-pond combination has been so designed and arranged as to permit a minimum of differential head between the approach flow box and open pond.

### *Developments at the fourdrinier (Beloit Iron Works)*

▶ To obtain maximum forming length for any given wire length, the wire guide roll has been relocated from its position near the suction couch roll to that of the return roll.

▶ Suction boxes have been redesigned to handle more water without flooding, and improved separators have been provided.

▶ Grooved table rolls are being used to decrease the rate of dewatering at the breast roll end of high-speed fourdriniers, to obtain more uniform de-

watering over the entire forming length.

▶ Deflectors of several designs are available to prevent sheet disruption at table roll nips.

▶ The Beloit patented air diaphragm guide has a rate of response proportional to the deviation of wire position from normal. It is completely dependent of wire speed and is governed by the position of a lightly loaded paddle against the edge of the wire. It is simple, rugged, and accurate.

▶ New special hole-drilling patterns on the couch roll and redesigned trailing have greatly reduced the noise level in the machine room.

▶ Beloit engineers believe that fourdrinier design will undergo the following changes during the next five years: (1) longer wires to provide more forming length, (2) more effective driving arrangement to better distribute wire tension around the wire loop, (3) reduction of wire wear through the use of improved suction box covers and moving surface types of equipment, (4) indication and control of wire tension, (5) improved doctoring of wire return rolls and (6) design improvement to reduce the time required to change a wire.

***Fourdrinier section (Black-Clawson)***

▶ The permanently-cantilevered fourdrinier, featured by Black-Clawson, consists basically of two beams running in machine direction. They are supported by a series of permanent cantilevered, pre-stressed cross beams. Everything on the fourdrinier, from breast roll to couch roll, is mounted on this structure.

▶ The mounting of the couch roll on the frame structure is an important structural change in the fourdrinier section, especially with the large diameter and width of modern couch rolls. In this arrangement, the stress of cantilevering is taken through a structural cantelever beam and not through the perforated shell and box section of the regular suction couch roll.

▶ This type of mounting facilitates the take-off of vacuum from each end of the couch, which is essential with large size couch rolls. In this arrangement the front vacuum take-off goes through the bearing housing construction into the cross cantilever beam to the backside—so that even with a front vacuum take-off no vacuum connections need be broken during a wire change.

▶ A recent development is the counterbalanced hydraulically-operated wire tensioning roll in close proximity to the wire-turning roll. The inertia of this set-up is such that a fast take-off can be made with load changes and slack. Maintaining this roll in constant position angularly with the wire permits the callibration of hydraulic pressure on the roll to read correct wire tension.

▶ The down-time for wire change on the modern fourdrinier has been greatly reduced. Hydraulic jacks, operated by remote control, lift the cantilever beams on the front side about 1/8 in. to remove the front post section. The cantilever beams are then lowered (a maximum of 1/2 in.), and the cross beams then support the entire fourdrinier.

▶ The wire is strung on two pedestals which run in restricting tracks permanently located in the aisle. During stringing, one of the pedestals is angled over to provide slack. After the wire is completely strung, this pedestal is moved back to vertical position, which tightens the wire to approximately wire-running tension. The wire is then moved, in less than 30 seconds, over the entire fourdrinier structure, using only the table rolls and the outside wire return rolls for support.

***Fourdrinier developments (Pusey & Jones)***

▶ The recent development of large lump-breaker rolls (30 in. or more in diameter), which press water out at the couch and thus make the sheet safer running in the draw at higher speeds, has resulted in a striking reduction of the moisture content of the sheet leaving the couch.

▶ The initial lump-breaker roll installations were made without crown. Subsequent trials, however, indicated that a crown of 100- to 115-thousandths of an inch was necessary to completely eliminate the wet center of the sheet.

▶ The relative performance of a large lump-breaker roll as compared to that of a small (12—18 in. diameter) roll is indicated from the experiences of a mill reporting a 7 per cent drop in steam consumption following the replacement of an 18-in. roll with a 36-in. roll. No reliable data are available to compare the relative performance of a 30-in. with a 36-in. diameter lump-breaker roll.

▶ The "Y" type deflector is designed to (1) support the wire between table rolls to achieve a more level wire with less wire tension and (2) remove the film of water from the underside of the wire to make drainage more effective and prevent the film from entering the nip of the following table roll where it would be driven back into the sheet. The blade of the deflector is actually a water-lubricated bearing material, and there is no wear on the underside of the wire and no discernable increase in power consumption following the installation of "Y" type deflectors.

▶ Among the advantages to be expected from the use of "Y" type deflectors are: (1) improved formation due to the elimination of stock jump, (2) increased machine speed, (3) increase in tensile and mullen, and (4) reduction in two-sidedness.

▶ Pusey & Jones engineers believe that changes made on the fourdrinier in the next few years will include the use of "Y" type deflectors to such an extent that the first 1/3 of the forming area will consist of 1-2 making boards plus "Y" type deflectors without table rolls. The remaining 2/3 of the forming area will be the conventional arrangement of one table roll per deflector. The table rolls will be grooved, and the grooving will be progressively changed down the wire in accordance with the decreasing water removal requirements—until the last several rolls will probably be smooth.

***Fourdrinier section (Rice Barton Corp.)***

▶ Rice Barton features the removable fourdrinier. Wire slack is accomplished by moving the entire unit forward with hydraulic cylinders until the remover mechanism engages the remover beam and an air motor moves the unit into the aisle for stringing the wire over the pit.

▶ The dual breast roll offers several advantages. The primary roll carries most of the wire load. The secondary breast roll and its doctor assembly are movable vertically and horizontally. This permits the design of a rigid non-adjustable bottom slice lip and the use of deeper saveall pans.

▶ Table roll bodies are appreciably wider than the wire. The journals are short and protected by sleeves, fingers, and shrouds.

▶ Suction boxes are supported on vertical springs from below, with cams on an oscillating shaft providing the motion.

***Fourdrinier developments (Sandy Hill Iron & Brass Works)***

▶ The wear on the deflector blades is still a problem. Any given wire will impart its own wear pattern on these blades. The wear pattern thus obtained will then result in incomplete con-

tact between wire and deflector blades when a new wire is put on the machine.

▶ The so-called lump breaker roll has progressed from its original function of "densifying" the sheet and raising the couch vacuum to a valid substitute for the old jacketed couch. A very large diameter and soft plastometer couch pressure roll seems to provide a similar effect.

▶ The rotary fourdrinier, which is neither a fourdrinier in the conventional sense nor a cylinder mold with vat, adds a basic new unit to the papermaking equipment. Basically it is a fourdrinier wire where the vacuum is obtained by vacuum pumps instead of table rolls. It is conceivable that the rotary fourdrinier may replace the cylinder mold with vat in the future.

### Press section (Beloit Iron Works)

▶ Developments in recent years have pushed press section barriers beyond present speed ranges. The successful application of the vacuum transfer principle has virtually eliminated couch breaks and has made possible high speed operation on light weight grades, newsprint, publication grades, and paper specialties, as well as kraft board grades.

▶ The "Twinner-press" vacuum transfer arrangement eliminates the need for a suction transfer press and replaces the conventional first and second suction presses. Accordingly, it eliminates (1) two felts passing through the transfer press, and (2) the first press broke conveyor. It also improves the positioning of the save-all on the suction pickup roll.

▶ The "Twinner-press" consists of a center roll and rubber-covered suction rolls on diametrically opposite sides. The entire assembly is canted at an angle of 45°. By removing the second suction roll, the unit can be converted into a simpler "Inver-press" which is normally followed by an air bleed straight through suction second press.

▶ In the air-bleed principle for second and third suction presses, the felt is led around the suction roll while the sheet follows the plain roll—so that sheet and felt touch only in the press nip. The suction roll has a suction box twice as wide as normal, so that air is bled through the felt on both sides of the nip. This gives the felt maximum absorbency and prevents sheet rewetting.

▶ The use of a hot press (plain or suction) in the production of heavy weight grades of food container board reduces the evaporative load on the dryers following the hot press.

▶ Centrifugally cast stainless steel suction roll shells give the best combination of strength and anti-corrosion properties—in line with the trend toward wider machines and heavier nip pressures. Facilities are now available for centrifugal casting of suction rolls of suitable diameter for machines of over 300 in. wire width.

▶ Beloit engineers believe that during the next decade there will be (1) improvements and modifications of the vacuum transfer arrangement, (2) a widespread use of the "air-bleed" and hot-press principles, (3) use of higher nip pressures, (4) perfection of suction roll silencers, and (5) a reduction in down time for felt and roll changes.

### Press section (Rice Barton Corp.)

▶ One of the most important basic changes has been the introduction of power operation for raising and loading the top press roll. Here the hydraulic system offers such advantages as (1) flow control which enables both ends of the roll to be moved simultaneously and (2) compactness of the equipment.

▶ In the felt cleaning system, a suction wringer wide enough to accommodate the full felt width has been adopted as standard equipment. The actual cleaning is done by a combination of high pressure and low pressure showers that drive the water through the felt from the inside.

### Dryer section (Beloit Iron Works)

▶ Dryers rating have been increased to 160 psi through (1) improvements in foundry practice and use of alloy steels, (2) improvement of steam fits, and (3) use of balanced design that has decreased power consumption.

▶ Other improvements include (1) enclosed gearing, (2) frame design to permit maximum accessibility, and (3) dryer doctor backs, doctor mountings, oscillating equipment—to maintain dryer surfaces in optimum condition. No major changes in dryer design are anticipated in the immediate future.

### Dryer section (Rice Barton Corp.)

▶ In a recently built machine, worm gears have replaced the helical gears on the drive side dryer journals. The worm shafts on the top tier, as well as those on the bottom tier of dryers, are connected by floating shafts. The two tiers are connected by vertical shafts and bevel gears for each drive. This arrangement allows freedom of design as far as dryer spacing is concerned and provides symmetrical drying including that of the edges of the sheet.

▶ The new steam joint, designed to be unaffected by radical changes in steam pressure, is a tight seal unit supported on a sleeve attached to the dryer journal. This support is obtained by a pair of anti-friction bearings designed for connection with the machine's continuous lubrication system. Both steam and condensate lines are connected to the steam joint through flexible metal hose.

▶ In the trailing knife coater, used on the paper machine, the sheet passes around a rubber-covered drum and the color is applied directly by a flexible blade supported by a holder which also forms the color reservoir. Speed has not become a limiting factor in the operation of this coater.

### Calender and reel (Beloit Iron Works)

▶ The calender stack is becoming a critical section of the new, wide, high-speed machine. The requirement here is more nip and heavier rolls for minimum roll deflection. Important design advances are anticipated in the next few years.

▶ Primary arm loading and spool starters insure good starts in the Beloit patented pneumatic reel, while the uniform nip loading as the reel builds up on the secondary ways results in uniform roll hardness from spool to outside layer. No major changes in reel design are anticipated during the next few years.

### Calenders (Rice Barton Corp.)

▶ While the open side calender has gained considerable popularity in offering maximum convenience for changing rolls, a recent design of the "A" frame type is equally accessible if equipped with proper roll handling equipment. The "A" frame type permits the hoist to travel the complete width of the stack without interference from cross shafts or girts, and the opening in the frame is wide enough to allow roll removal endwise without disturbing the other rolls.

### Paper machine drive (Beloit Iron Works)

▶ A major development in the last five years has been the Beloit differential type paper machine drive which is capable of holding the various machine sections together with an accuracy of draw many times better than was previously possible. The mainte-

(Continued on page 71)

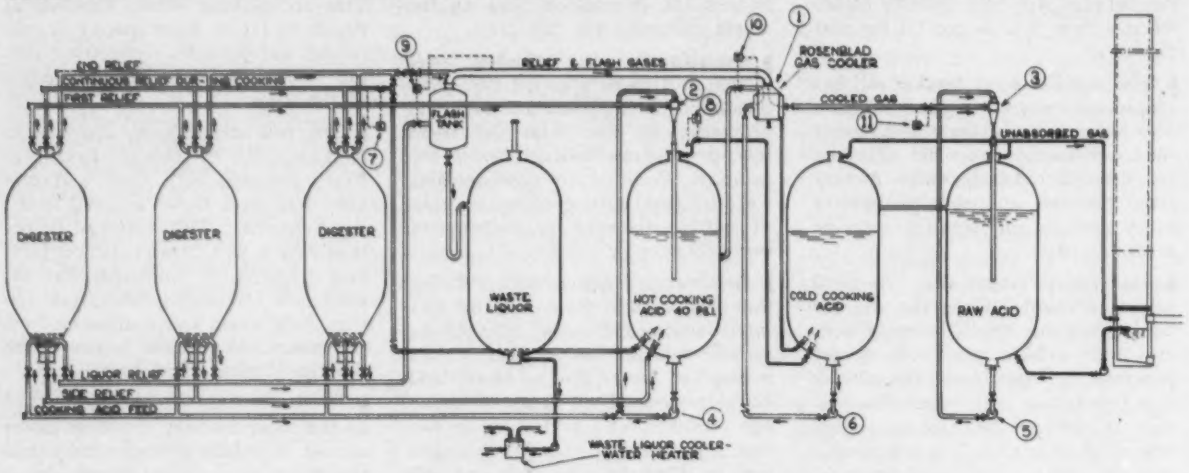



Fig. 1. Heat and $SO_2$ recovery system with Rosenblad heat exchangers

# Use of spiral heat exchanger for heat recovery

LEO WALTER*

**▶ Some special applications of the Rosenblad spiral heat exchangers, especially in heat and $SO_2$ recovery in sulfite pulping and heat recovery in sulfate pulping**

INSTALLATIONS OF EVAPORATORS with Rosenblad blow-steam condensers are now almost standard in Scandinavian mills and are introduced in pulp mills on the European continent. Just to mention a few: plants of this kind operate in the pulp mills Couze and Saillat in France, in a couple of Polish mills, and also in new mills in New Zealand and in Pakistan. Condensation of blow-steam seems to become widespread, and it is claimed that heat recovery is very advantageous if this type of plant is connected in series with heat recovery in a surface condenser in the black liquor evaporation plant, as will be shown in the following description. For normal operation conditions, the heat recovery in the blow-steam condenser could be considered 1,600,000 BTU per ton of pulp. This figure could be increased to about 4,000,000 by pre-heating the fresh water in the surface condenser.

### *Heat and $SO_2$ recovery uses spiral exchanger*

A heat and $SO_2$ recovery plant has recently been installed in Austrian sulfite pulp mills in Lenzing, Rechberg and Neusiedl, and a brief technical description of this type of plant is given in the following. The basis is that $SO_2$ gas should be absorbed in cold raw acid, this latter being heated and stored under pressure. The heating will thus take place mainly indirectly. Heat is recovered from sulfite waste liquor being flashed to atmospheric pressure. Cooking acid is being heated to 75-80°C by means of digester waste heat of about 100°C.

### *Continuous relief and side relief*

The gases, relieved continuously during the period of the cooking cycle (Fig. 1) when the digester is kept at top pressure, pass a pressure controller and enter into the bottom of the hot cooking-acid tank. By means of a pressure controller this tank is kept at 35 to 45 psi, the correct pressure depending on $SO_2$ content and temperature (generally 170 or 175°F.) of the acid when fed to the digesters. Escaping gas, passing through the throttle valve of the pressure controller, is entered into the cold cooking-acid tank. The amount of steam-gas mixture from one cook introduced into the acid by continuous relief, is generally enough for heating one batch of cooking acid 14 or 18°F. A certain amount of $SO_2$ simultaneously is absorbed in the acid which has to be taken in consideration when preparing the acid. If side relief is practiced the side-relief liquor is also preferably led into this hot acid tank.

### *First relief*

When the cooking is performed the first relief takes place, which usually brings the temperature in the digester from the maximum temperature 275° to 300°F. down to 250° to 260°F. These first relief gases are entered into the hot acid tank by way of an ejector, driven by an acid circulation pump. The pump is started when the pressure in the digester is lowered so much that no considerable amount of gas is passing over. By this method the operator has ability to relieve the digester to a lower pressure than would be the case if the first relief gases were entered directly into the tank without using ejector and pump. The amount of heat relieved is generally enough for raising the

*Consulting engineer

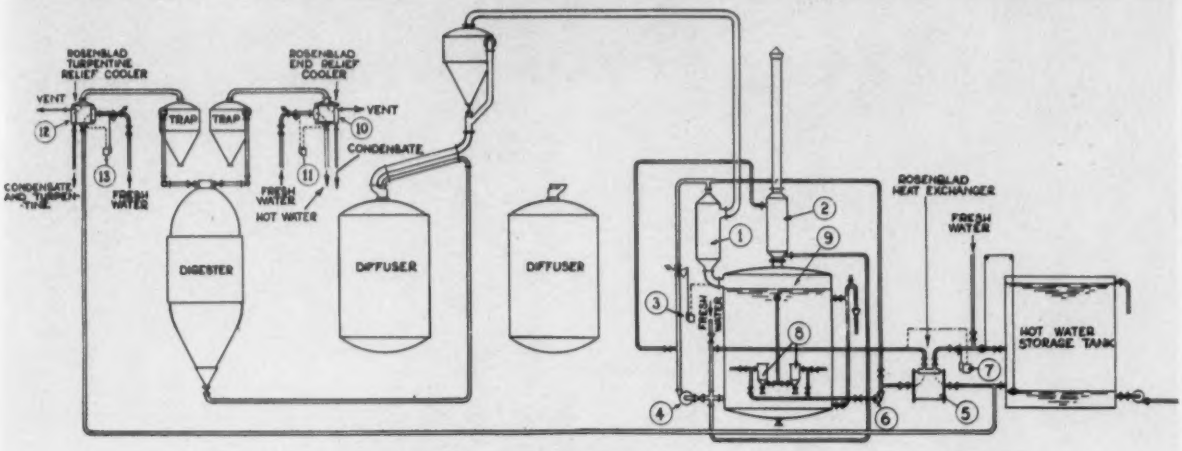



Fig. 2. Rosenblad heat recovery system in a sulfate pulp mill

temperature of one batch of cooking acid 30 or 40°F. This acid temperature rise (and amount of $SO_2$ absorbed) depends on the temperature range for the relief as well as the amount of acid per cook in proportion of the digester "water value" when relief starts. If several tanks for hot cooking acid are provided (total capacity, at least three batches of acid), all tanks should be equipped with ejectors connected in parallel for use alternately with the joint pump.

### End relief and liquor relief

End relief and liquor relief, starting immediately after first relief, take place simultaneously and are controlled by a pressure controller. This controller maintains a limited pressure before the gas-coolers to the effect that the steam-gas mixture flow to these will correspond to their capacity. Further, this controller maintains a certain pressure in the digester by means of throttling the relief gases until the liquor relief is adequately performed. This end and liquor relief from 250 to 260°F. to approximately 212°F., corresponding to a lowering of the pressure from the order of 30 psi to atmospheric, generally requires about one hour, for which the gas-coolers are accordingly dimensioned.

Depending on different local conditions, i.e., mainly the maximum cooking temperature, if direct or indirect cooking and degree of side relief, a larger or smaller part of the heat is transferred by means of the gas-coolers to cold cooking acid. The balance is used for heating water for pulp washing, bleaching, etc. During this heating one batch of acid is passed from a cold cooking-acid tank to the tank for hot acid. A temperature controller maintains a constant temperature on the acid entering the tank. Generally, the temperature of the acid entering the tank (before absorbing heat from first relief, continuous relief and side relief) can be kept at maximum 130° to 140°F. The temperature in the cold acid tank is kept around 85°F., which decides the maximum amount of heat that can be received by way of the gas-coolers.

The gas from the gas-coolers, cooled down to approximately 140°F., enters the raw acid tank by way of an ejector driven by a raw acid circulation pump. If several raw acid tanks are provided (total capacity preferably three batches of acid), each tank should be equipped with an ejector, all three ejectors being connected in parallel for working alternately with the joint pump. A pressure controller throttles the gas for maintaining a constant pressure after the gas-coolers. Unabsorbed gas at approximately atmospheric pressure leaves the raw acid tanks and the cold cooking acid tank through a gas-header, which leads the gas into the acid tower. The gas at 140°F, entering the raw acid generally raises the temperature of one batch of acid 5 or 10°F.

### Recovery from $SO_2$

The sulfur recovery is high as the $SO_2$ gas, led to the different tanks and to some extent to the acid tower, is mixed with negligible amounts of air and thus is highly concentrated or mixed with steam. The main sulfur loss is caused by the sulfur content of the waste liquor, which, however, varies depending on local conditions.

The heat recovery can be estimated as the additional heat content of the acid fed to the digester, when using this heat recovery system compared to the result when using simpler systems. Further, the heat content in the eventually heated water for pulp washing or bleaching has to be calculated as recovered heat.

The additional heat content of the acid, when fed to the digesters, depends much on local conditions such as the possible temperature of the acid, considering $SO_2$-content and pressure as well as the amount of acid per ton of pulp.

### Feeding acid to the digesters

As a high $SO_2$-content in the acid to the digesters is essential, the pressure of the acid must not be allowed to decrease, which should cause some of the $SO_2$ to escape. Therefore, the digester should be kept under pressure when the acid is entered. This might be done by connecting the digester top to other operated digesters before feeding the acid. A different method is to have the digester top closed without applying pressure to it. When then the acid enters, some $SO_2$ will escape, which together with the air present in the digester will be compressed and provide the necessary pressure by means of which further $SO_2$ loss will be prevented and some of the $SO_2$, relieved at the beginning, will be absorbed again. The air-gas mixture will later escape by continuous relief to the hot acid tank from where the air is transferred through the cold acid tank to the acid tower. It might also be found advisable to let off this first gas before the continuous relief starts (before the di-

(Continued on page 86)

Booming ground and log haul at MacMillan & Bloedel's Harmac mill. Note Colby crane and chip barges

# Operation of the woodmill unit at MacMillan & Bloedel's Harmac mill*

RALPH BROWNHILL

THE FUNCTION of this unit is to supply hemlock and fir chips, as well as hog fuel, to meet the requirements of the MacMillan & Bloedel Ltd. mill at Harmac, B. C. This is accomplished by programming the woodroom to make up any shortage between pulp mill requirements and sawmill deliveries in both quantity and species.

The pulp mill's supply of chips and hog fuel is classed according to origin as: (1) Scow chips and hog fuel; (2) Truck chips and hog fuel; (3) Woodroom chips and hog fuel.

*Based on a paper presented at the fall meeting of the APPMSA, December 1-3, 1955.

**Operation of this unit is based on a complete co-ordination of supplies of (1) scow chips brought in by a fleet of barges and handled by crane and belt conveyors, (2) truck chips fed by chain conveyor into a Conveyair system, and (3) wood room chips.**

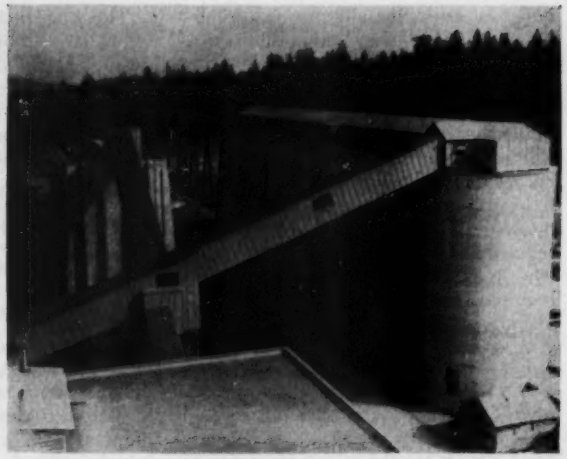
### *Scow chips and hog fuel*

The first classification (scow chips and hog fuel) is handled by a fleet of 24 box-type barges with carrying capacities ranging from 300 to 600 units. These barges have open tops, and the boxes are made of 3-in. planking, lined with ¾-in. plywood. This plywood lining greatly reduces box maintenance as compared to unlined scows. The scow deck is protected by a layer of 3-in planking.

The scow dock is of sufficient length to moor four of the smaller barges or three of the larger ones.

Rails on 20-ft. centers, on which a Colby crane operates, run the length of the dock. A 30-in. belt conveyor of a length sufficient to cover two barges completes this section.

General view of crane and woodroom



Chip silos at Harmac

Bull saw in operation at the MacMillan & Bloedel mill

Simmons hydraulic barker

Two 30-in. belt conveyors — one for chips and one for hog fuel — carry the supplies from the dock into the mill system.

The Colby crane, operating on the scow dock, is a 5-ton double cantilever-type, operating a 4¾-yd. or a 2/3-unit bucket. The bucket, originally supplied when the crane was installed, had a capacity of 3¾-yd. or half a unit. Increased scow receipts made it necessary to either install additional unloading facilities or speed up the existing crane. A new and larger bucket was designed with tubular supporting arms, a steel framework, and covered with aluminum plate. This gave a larger bucket with no increase in weight. It has a reach of 64 ft. on either side of the center line, with which it can unload a barge 46 ft. in width or unload hog fuel to a dock storage area.

Situated in the center of the crane is a large hopper into which the bucket drops its load. Discharge from this hopper is made by chain conveyor through an adjustable gate to the dock belt.

The crane is controlled by an operator in a glass-enclosed cab just under the boom on the outboard, or scow, side of the main structure supporting the boom. He has five power units to operate.

1. The hopper conveyor feeding the dock belt.
2. The dock travel, which enables him to move to any position over two barges.
3. The racking unit, which moves the bucket from scow to hopper.
4. The holding unit, which raises or lowers the bucket.
5. The closing unit, which opens or closes the bucket.

Unloading rates vary due to tidal elevations, screened chips, unscreened chips or hog fuel. The average rate of unloading chips is 56 units per hour. Peak production runs up to 90 units per hour. The average is brought down to 56 units due to lubrication, line changes and scow cleanup. Hog fuel unloading averages 38 units per hour — hemlock and fir fuel running faster, and cedar much lower. All barges are cleaned out with a small cat-type bulldozer which is lifted into the scow with the crane bucket.

The dock conveyor head and tail pulleys are mounted on carriages run-

ning on rails. By altering its dump point, it can convey either chips or hog fuel.

Electrical and mechanical maintenance is fairly light. Electrically, replacement of contacts forms the bulk of the work; mechanically, sheaves, bucket and counterweight carriage bearings, and fairlead rollers in the bucket require attention. Racking lines require changing about every six months. A new ⅜-in. bucket line is required every six days of 24-hour operation.

A new line is first put on as a holding line. Then, when wear starts, it is turned end for end. Before strands start to crack or break, it is removed from its holding line position and used twice as a closing line, one on each end. Line changes take 30 min.

All chips from scows are screened and all hog fuel re-hogged in the chip screen building. This building houses eight Rotex chip screens, two rechippers and one Gruendler hammer hog.

Scow chips are conveyed by belt conveyors to an 80-unit surge bin over four of the Rotex chip screens. Feed to the screens is controlled through variable-speed star feeders. The top deck of the screens is of 1½-in. square punched plate. The sawdust deck is of 4 by 4 to the inch Monel wire mesh. Oversize from the screens are conveyed to a Sumner eight-knife rechipper. The discharge is rescreened. The two rechippers — one a Carthage, and the other the Sumner — are fitted with vibrating chutes. From the chip screen building, the screened chips are conveyed by conveyor to the silo distributing belt.

### *Truck chips and hog fuel*

The second source of supply is by truck. There are two dumps — one for chips and one for hog fuel. The chip dump handles 10- and 13-unit trucks. The 10-unit trucks are of the semi-trailer type. The 13-unit trucks have a six-unit box on the truck and tow along behind a seven-unit full trailer. Trucks are upended with an electric hoist to an angle of about 60° and discharge their load into a hopper. A two-flight chain conveyor carries the chips to the Conveyair system. This system is comprised of a small hopper mounted over an auger, which pushes or screws the chips into an air stream from five blowers. An 8-in. pipe then conveys the chips to one of two silos, depending on the species being handled. The pipe is approximately 120 ft. long. It has a vertical lift of 60 ft. This system moves about 35 units per hour.

The hog fuel truck dump consists of a large hopper into which the six-unit self-dumping trucks back up a ramp to dump their load. This fuel is then fed by chain conveyor to the boiler house conveyor system.

### *Woodroom chips and hog fuel*

The third and most variable source of supply is the woodroom. This is the balancing unit for quantity and species.

Booms to the woodroom come from two main sources: (1) from the logging operations, where a pulp and sawmill sort is made, and (2) rejected logs from the sawmills. Log diameters range from 4 in. tops to 60 in., and lengths vary from 12 to 80 ft. All logs over a maximum diameter of 30 in. are put through the splitter saw. This saw is housed in a building moored in the booming ground and supported by creosote plywood pontoons. The saw is a drag-saw type. It rips the logs into quarters, handling about 20 logs per 8-hr. shift. These quarters are fed with the under 30-in. diameter logs up an all-steel log haul and are cut by a 102-in. Sumner bull saw to lengths not exceeding 26 ft. They are then transferred across to the barker roll case. The hydraulic barker is a Simons rotary head-type, operating with 1550-lb. pressure and 1100 gpm. Two pumps supply water to the barker. The first pump takes mill water of 40-lb. pressure and boosts it to 250 lb. to the suction of the main pump. The variable-speed roll case runs up to 120 fpm. Incompletely barked logs are kicked off to a run-around conveyor and put through the barker a second time.

The chipper is a Sumner 153-in., six-knife, running at 277 rpm. It is direct-driven by a 1500-hp motor. From the chipper, the chips are conveyed to the surge bins. The same process is repeated as for scow chips. Production ranges from eight to 20 M fbm per hour, depending on the size and tightness of bark of the logs being run. Barker refuse is picked up by twin conveyors in the barker with ¼-in. perforated plate bottoms. The drainage from these conveyors flows over two Tyroc vibrating dewatering screens, fitted with 0.021-ton cap wire mesh. All woodroom refuse is conveyed to the hammer log, where it is hogged along with the scow hog.

### *Coordination of supplies*

All outside sources of supply each Friday forward a report, giving their estimated production for the following two weeks by quantity and species. Booms for woodroom cutting are then lined up to compensate for any shortage both in quantity and species. Each morning, all mills report to the tug dispatcher, giving him the estimated completion time of the scows they are loading and the empty scows on hand. The dispatcher then arranges for towing the loads to the pulp mill and for towing the empty scows at the pulp mill to the sawmills. Harmac receives the information on all scows, including their estimated arrival time at the pulp mill.

Sawmill chip forecasts are generally reliable; but there are times, due to changes in freighter schedules, when species cutting are changed on short notice. Then again, breakdowns and/or high or low quality lumber logs will materially increase or decrease chip production.

Chip storage consists of 10 silos. These silos hold a maximum of 2700 units. They are of round concrete construction with a steel plate cone bottom, from which discharge is made to the digester chip belt by a turntable feeder. Hangups or bridging of chips occur from time to time. We have not as yet been able to solve this problem. Our means of breaking down hangups is to vibrate the steel cone by swinging a chain-supported heavy weight against it. This is rather primitive but effective. Our most successful operation of the silos is when they are kept at about the half-way mark and are drawn quite frequently. To ensure an adequate supply of chips to the pulp mill, and to provide enough storage space for peaks in incoming chips, we try to keep our inventory at about 60 per cent of our storage capacity.

As the woodroom and sawmills operate on a Monday-to-Friday work week, silo inventories are usually low on Monday and are built up by Friday. The week-end is provided for by off-loading chip scows on Saturday and Sunday.

As there is no means of holding up chip trucks, storage must be available at all times to take care of their loads.

In the scow fleet, certain scows are kept on the hog fuel run and the balance on chips. The reason for this is that, although scows are well cleaned, it eliminates any possibility of dirt or bark getting into the chip supply.

Scow unloadings are scheduled as far as possible to provide empties — so that the tugs bringing the loads to the pulp mill will have an empty to take back on the return trip.

The woodroom cut is scheduled daily to keep our supplies of chips in balance.

# Sulfur dioxide exposure and control

## —exposure to other hazardous materials, i.e. chlorine gas, lime and salt cake dust

BENJAMIN FEINER* and SIDNEY MARLOW**

THE EFFECT AND CONTROL of exposure to hazardous materials, such as sulfur dioxide, chlorine gas, lime and salt cake dust was investigated in the course of an industrial hygiene study made during the last 1½ years in 11 chemical pulp mills in New York State. An inspection of the flow sheets for the soda and sulfate processes (Figs. 1 and 2) shows them to be quite similar with regard to their unit operations. The industrial hygiene problems are therefore the same for both processes and are mainly concerned with the handling of the lime and the operation of the lime kiln.

Lime dust exposure may become quite high in car unloading and in lime transportation by conveyors both from the car and from the kiln. In the sulfate process dust problems also exist with respect to car unloading and conveyor transport of salt cake. One solution of these problems is the use of pneumatic car unloading, and the enclosure and ventilation of other conveyors, elevators and storage bins. In the smelting of soda process liquor, one type of furnace operates at atmospheric pressure. Occasionally, a positive pressure is created within the furnace resulting in leakage of dust from the furnace into the workroom. The solution here is better furnace operation and possibly automatic control to prevent positive pressure furnace operation. Since, in both the soda and sulfate processes, the first rinse of the pulp in the washing process is by hot black liquor, the washer should be adequately hooded and ventilated to keep steam, hydrogen sulfide, mercaptans, and other objectionable vapors out of the workroom atmosphere.

*Sr. Industrial Hygiene Engineer, New York State Department of Labor
**Industrial Hygiene Engineer, New York State Department of Labor

### *Sulfur dioxide exposure*

The preparation of sulfur dioxide is similar for both the sulfite and semi-chemical processes (Figs. 3 and 4). Sulfur is melted in a tank heated by a rotary burner and then fed to this burner. The sulfur, vaporized in the burner, enters a combustion chamber where it is oxidized to sulfur dioxide. This operation is usually confined to a separate room or shed.

In the sulfite process, free sulfur dioxide is present in the cooking and spent liquor. This differs from the situation existing in the semi-chemical process. The "cooking" liquor used in the semi-chemical process is essentially a neutral solution of sodium sulfite with sodium carbonate added as a buffer. No free sulfur dioxide is present in the semi-chemical cooking or spent liquor.

Potential exposures to sulfur dioxide are ever present from the time

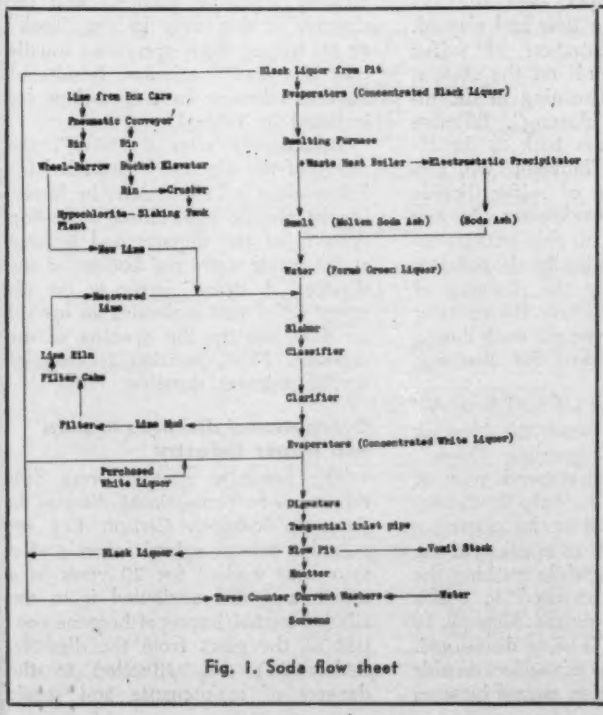



Fig. 1. Soda flow sheet

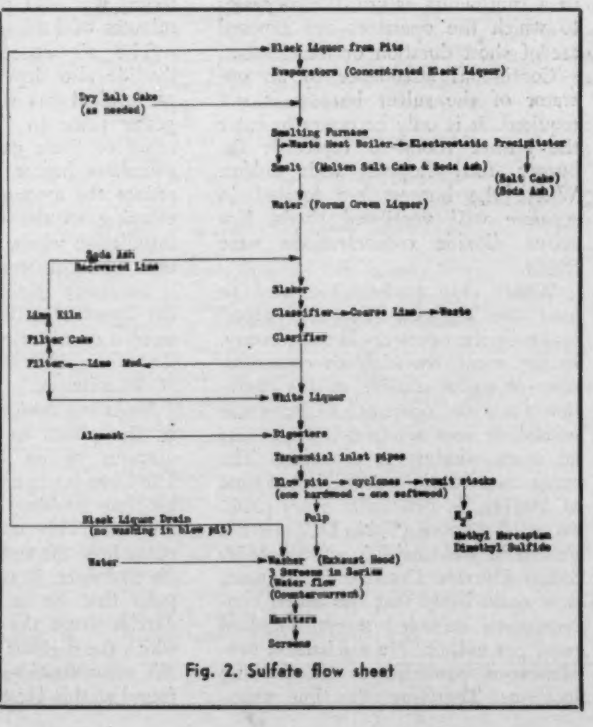



Fig. 2. Sulfate flow sheet

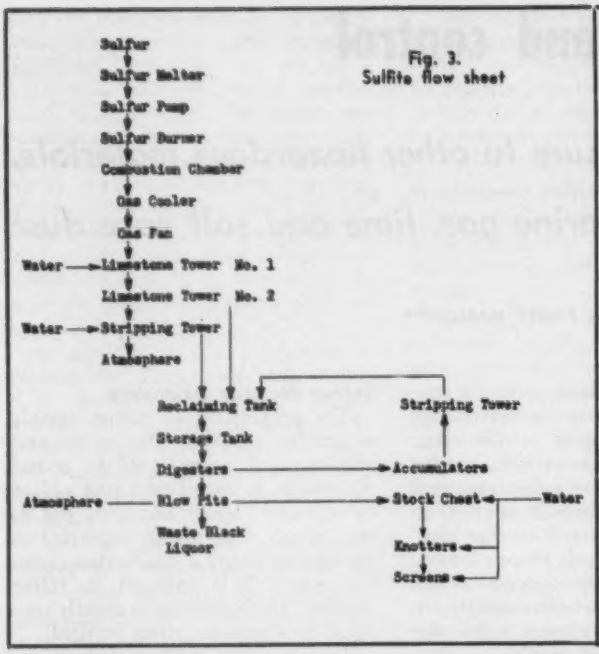



Fig. 3.
Sulfite flow sheet

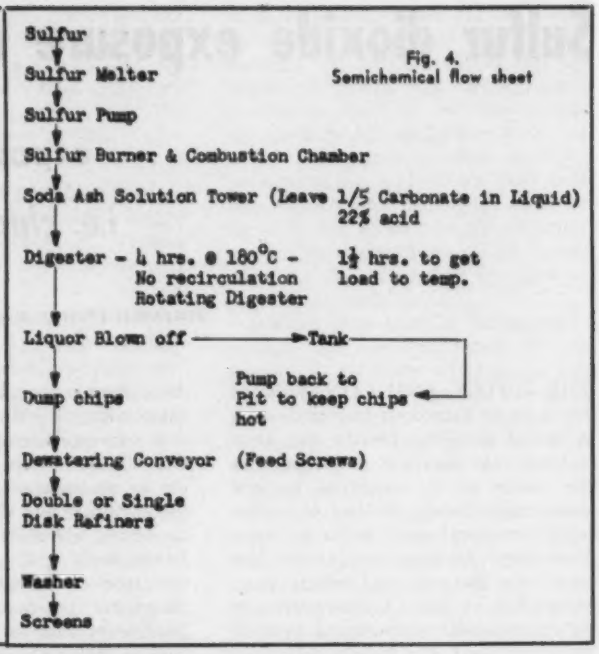



Fig. 4.
Semichemical flow sheet

and place of its formation at the sulfur burners and particularly throughout the entire sulfite process till the final rinsing of the finished pulp. Determinations at various locations of the concentration of sulfur dioxide in the air were made with an M.S.A. Sulfur Dioxide Gas Detector. Results of these measurements are given in Table I. With the exception of the acid plant, where the operations are of a continuous nature, the processes to which the operators are exposed are of short duration or intermittent.

Continuous attendance by an operator of the sulfur burners is not required. It is only necessary to enter the burner room to replenish the burner feed hopper with sulfur. Where the burners are located in separate well ventilated sheds, low sulfur dioxide concentrations were found.

Where chip packers are used to load the digesters, constant supervision by the operators is unnecessary. In any event, the high air concentrations of sulfur dioxide at this operation force the operators to leave the immediate area and seek refuge near an open window or doorway. The surge concentrations at the initial time of loading, in practically every plant, exceeded 50 ppm (Table I). Since the maximum scale reading of the MSA Sulfur Dioxide Detector is 50 ppm, it is quite likely that the actual concentrations exceeded several hundred parts per million. No mechanical ventilation is provided at the loading locations. Therefore, the time necessary for dissipation of sulfur dioxide depends on the location of the loading point relative to any open doors and windows. In one mill where the loading point of a particular digester is located in a naturally well-ventilated area, the concentration of sulfur dioxide was reduced to less than 2 ppm within a ten-minute period. In one poorly ventilated loading area, the air concentration of sulfur dioxide detected was 300 ppm, even after 35 minutes of loading time had elapsed.

The air concentration of sulfur dioxide also depends on the amount of residual gas remaining in the digester prior to "blowing". Effective relief of these gases back to the accumulator before "blowing" will also reduce the amount of sulfur dioxide escaping to the workrooms. In one installation where no chip packers are used, close supervision by the operator is necessary during the charging of the digester. In this case, the operator wears a cannister type gas mask during the entire time taken for charging, 30-40 minutes.

Signaling devices are used at several of the plants to warn the blow-pit operator of an impending "blow". The blow-pit operator spends most of his time washing the pulp in another blow-pit. This is done by playing a water hose through an opening of the pit enclosure. It is while washing the pulp that he is exposed to sulfur dioxide from the nearby blow-pit to which the digester is being discharged. Air concentrations of sulfur dioxide found at this location ranged between 20 to 50 ppm. In addition to the factors mentioned above, the proximity of the blow-pit operator to the pit being blown, is of significance.

It is the task of the "cook" or his helper to open the blow valve on the blow-pit floor in order to start the "blow". The valve is located adjacent to the blow-pit into which the digester is being discharged. Repacking and closing the blow valve before the cooking liquor is pumped into the digester is also done by the "cook" or his helper. Both operations usually take less than 5 minutes. Results of air tests taken at these operations are included in Table I.

Immediately after a "blow", the inside of the digester is inspected for "blow clean". This is done by lowering an electric light through the top opening of the digester and looking at the inside walls and bottom of the digester. A steam ejector in the digester relief vent maintains an inward air flow into the top opening of the digester. This operation is only of several minutes duration.

### *Occupational diseases in pulp and paper industry*

The literature contains very few references to occupational diseases in the pulp industry. Carlson (1) reported a case of aplastic anemia of a man who worked for 20 years in a sulfite mill and attributed it to the alleged methyl isopropyl benzene content of the gases from the digester. Pedely (2) calls attention to the dangers of maintenance and repair

work inside digesters because of a lack of oxygen and the presence of residual sulfur dioxide; to the intense glare from smelting furnace openings; and to sulfur dioxide in the sulfur burner house and the digester house.

A study (3) of workers exposed to sulfur dioxide in the manufacture of electric refrigerators revealed a significantly higher incidence of nasopharyngitis, both chronic and slight, an alteration of the senses of smell and taste, high urinary acidity and increased fatigue. In this study, the concentrations of sulfur dioxide averaged about 30 ppm with occasional peaks up to 100 ppm.

### *Control of sulfur dioxide*

The various locations in the pulp mill where there are potential exposures to sulfur dioxide as well as suggested methods of control are given in the following check list. (It should be noted that only some of these items affect the semi-chemical plant, but that all of them affect sulfite mills.)

**Sulfur Burner**

1. Locate sulfur burner and combustion chamber in separate well ventilated room or building.

2. Properly control feed rate of sulfur to obtain efficient burning.

**Acid Towers**

Provide stack jet ejectors to maintain negative pressure in tower with stone charging door and cleanout door open.

**Acid Plant**

1. Concentrate sampling lines in one location under a ventilated hood and over a trapped drain line to sewer. Provide running water at drain.

2. Check routinely for liquor leaks from pump glands, storage tank, etc., and gas leaks from storage tank covers and vents.

**Digesters**

1. Concentrate sampling lines in one location under ventilated hood and over trapped drain line to sewer. Provide running water at drain.

2. Provide well-fitting metal chute connection from chip bin or conveyor to digester top feed opening to minimize escape of displaced gas from digester to charging floor while loading with chips.

3. Provide mechanical ventilation for digester charging and operating floor. General ventilation appears to be most feasible.

4. Operate valves (e.g. blow valves) which are not on charging floor, mechanically or electrically from charging floor.

**Blow Pits**

1. Use stack jet ejector or exhauster on "vomit" stacks to prevent backdraft in adverse wind.

2. Use tall enough "vomit" stacks to prevent downwash in adverse wind.

3. Use water sprays in top half of blow pit. Spray period should extend for a long period before operation of sluicing hoses.

4. Mechanical tank agitation with sprays may dispense with need for sluicing by hose.

### *Exposure to chlorine*

The other major part of a pulp mill, common to pulp making processes, is the bleach plant. There are several types of bleaching processes in use but the most common in chemical pulp mills in New York is the three-stage process using chlorine gas in the first stage, caustic soda solution in the second and a hypochlorite solution in the third, followed by a final water rinse. Where the chlorine and hypochlorite are accurately metered in pro-

**TABLE I—Sulfur dioxide exposure**

| Location of Air Sample | Conc. of $SO_2$ in air ppm | Process or Operation | Remarks | Pulp Mill |
|---|---|---|---|---|
| Sulfur burner room | 2 | Melting and burning sulfur in rotary kiln. | Burner in separate shed; well ventilated. | 1 |
| | 2 | Melting and burning sulfur in rotary kiln. | Burner in separate shed; well ventilated. | 2 |
| | 12 | Melting and burning sulfur in rotary kiln. | Burner in separate room adjacent to "acid room"; no windows; poor ventilation. | 3 |
| Blow valve floor | 20 | Opening blow valve; valve adjacent to blowpit into which digester is discharged. | Operator (Cook's helper) leaves location after opening valve. Operation of 5 minutes duration. | 1 |
| | 50* | Opening blow valve; valve adjacent to blowpit into which digester is discharged. | Valve near open door; best ventilated area relative to location of other valves; it was necessary | 2 |
| | 5 | Opening blow valve; valve adjacent to blowpit into which digester is discharged. | for operator to put on gas mask after opening valve. | 4 |
| | 50* | Repacking and closing valve. | Operator (cook) performs operation; about 5 minutes duration. | 3 |
| | 25 | Removal of pulp sample from blowpit (immediately after blow); washing sample. | Good inward draft through sampling doors of blowpit; operation less than 5 minutes duration. | 2 |
| Blow pit floor | 50 | Blowpit operator washing pulp in nearby blowpit; previously blown. | Operator about 25' from blowpit into which digester is discharged. Air sample immediately after blow. | 3 |
| | 20 | Blowpit operator washing pulp in nearby blowpit; previously blown. | Same as above; air sample 5 minutes after blow. | |
| | 20 | Blowpit operator washing pulp in nearby blowpit; previously blown. | Operator about 125' from blowpit into which digester is discharged; air sample immediately after blow. | 4 |
| Digester Loading Floor | 15 | Opening top of digester; inspection for "blow-clean". | Steam ejector in blow pipe used to maintain inward airflow into digester top opening. | 3 |
| | 50* | Recharging digester with wood chips. | Cook and helper leave area after "packer" is set in place; 30-45 minute duration. | 1 |
| | 30 | Recharging digester with wood chips. | Digester charging opening near open doorway. | 2 |
| | 2 | Recharging digester with wood chips. | Same as above; repeat air sample 10 min. later. | |
| | 50* | Recharging digester with wood chips. | Air sample immediately after recharging commenced. | 3 |
| | 40 | Recharging digester with wood chips. | Same as above; repeat air sample 10 min. later. | |
| | 50* | Recharging digester with wood chips. | Air sample immediately after recharging commenced. | |
| | 50* | Recharging digester with wood chips. | Same as above; repeat air sample 10 min. later. | 4 |
| | 30 | Recharging digester with wood chips. | Repeat air sample 35 min. later. | |
| Acid plant (room) | 20 | Cooling of sulfur dioxide; control sampling, etc.; continuous type operation. | Possible leaks in piping or cooling coils. | 3 |

*Maximum scale reading of MSA sulfur dioxide air sampler is 50 ppm. It is highly probable that the air concentrations of sulfur dioxide ranged between 200-500 ppm.

portion to the stock so that there is no excess chlorine, the need for ventilation of the bleach chests is minimal. However, as a precaution against accidental over-dosage, the chests should have top covers, the rinse washer should be hooded, and both should be mechanically ventilated to the outside atmosphere. Plants which manufacture their own hypochlorite solution by mixing chlorine gas with a lime slurry have the same problem and such mixing tanks should be covered and ventilated, for the control of both chlorine gas and lime dust.

The same precautions in handling tank cars and tanks of chlorine, and in using piped chlorine as are observed in water chlorination should be observed in pulp mills.

Among the other types of bleach plants encountered were those using zinc hydrosulfite and those using sodium peroxide. These materials are received and stored in metal drums. They both decompose readily in contact with water. Sodium peroxide is explosive when mixed with a combustible substance, and it is strongly caustic. Therefore, it is necessary to safeguard the storage, handling, opening and dumping of the drums, and to adhere strictly to the precautions printed on the drums and their labels.

### Bibliography


(1) Carlson, G. W., *Ann. Int. Med.* 24, 277-284 (Feb. 1946)

(2) Pedley, F. G., *Jour. Ind. Hyg.*, 6, 28-39 (May 1924); 70-78 (June 1924)

(3) Kehoe, R. A.; Machle, W. F.; Kitzmiller, K.; LeBlanc, T. J.; *J. Ind. Hyg.*, 14, 159 (1932)


# Kimberly-Clark's noise control program

MARION L. BRIGGS

**▶ Features include specially designed silencers, drilled hole patterns, and acoustic booths**

ONE OF THE LARGEST paper research laboratories in the world, located at Kimberly-Clark Corp. in Neenah, Wis., has come up with some substantial developments in noise control.

According to Dr. M. N. Davis, technical research associate, Kimberly-Clark has made complete noise surveys of all its mills, with periodic checks, and believes it knows where the noise is. It is keeping up to date on it, and is making progress in its control by new equipment devices and design.

Since one of the latest trends in high-speed papermaking has been to use suction transfer equipment to transfer the wet sheet from the wire to the suction presses, it has been found that this equipment, in its initial installations, has been an especially bad source of noise. But, Kimberly-Clark has had good results cutting down this noise to where the roll can scarcely be heard by using the Abbott and Kraus silencer on the first of its vacuum transfer installations.

### The Abbott and Kraus silencer

The silencer, of course, is not a new invention in itself, having been developed by E. J. Abbott and J. D. Kraus in 1937, through the joint efforts of Kimberly-Clark and Beloit Iron Works. But, Kimberly-Clark never had to use it on tissue machines until they reached speeds in excess of 1200 fpm. Currently at the company's mills, some of the high-speed fourdrinier tissue machines are operating at a rate in excess of 2000 fpm.

The problem was to find out by experimentation just how to make the silencer operate effectively on the creped wadding machines, and in this Kimberly-Clark was successful.

As is well known, the noise from the couch or suction roll is caused by the rapid intake of air through the more than 100,000 quarter-inch holes in the cylinder, after they have been evacuated, and when they have moved past the suction box at the wet end of the tissue machine. It is estimated that approximately 500,000 holes per second emit noise pulses as the roll revolves.

When the 2-in. long Abbott and Kraus silencer — generally made of the same material as the suction box seal — is fitted to the suction box, it produces an air gap that prevents the rapid rush of air into the couch holes. Its effective use, however, demands a correct estimate of the size of gap needed under varying conditions.

For instance, a larger gap is required for speeds in the vicinity of 2000 fpm than for speeds around 1500 fpm. Other factors affecting the size of the gap are vacuum level and felt density.

### Specially drilled hole patterns

At best, however, Kimberly-Clark considers the silencer attachment only a temporary means of reducing noise on vacuum transfer installations. For, as it purchases new installations, it plans to order them equipped with the new specially drilled suction rolls, either of the type developed by Dr. George J. Thiessen of the National Research Council, Ottawa, Canada, or a similar kind designed independently by Beloit Iron Works.

"When buying a new roll, it would seem foolish not to buy it as a specially drilled roll if there is any chance that it will be used on a fast machine," declares Dr. Davis.

Meanwhile, with its small skilled maintenance upkeep and its effective operation, the silencer is proving a satisfactory means of controlling tissue machine suction roll noise. The company now has about 60 rolls equipped with the silencers.

By experimentation, Kimberly-Clark has found it can reduce the noise of a tissue machine roll 25 to 30 decibels with either the silencer or the Thiessen or Beloit drilled roll. In the latter, the holes are so arranged in a spiral pattern on the cylinder that sound waves emitted from them with the rush of air following evacuation collide with each other and knock each other out.

"As suction roll noise is surrounded by a great deal of other mill noise, the improvement in noise reduction the operator hears might be as little as 5 decibels, or could be as much as 15 decibels," says Kimberly-Clark's technical research associate. And experiments at the mill have borne this out.

So far as the actual installation to date of the drilled roll for commercial use goes, it is believed that Great Northern Paper Co. in East Millinocket, Maine, has the first one, installed by Beloit Iron Works. However, in Canada, Powell River Co. Ltd. is using a serrated seating strip on the suction boxes in couch and press rolls. They are believed to operate on a similar principle.

Now that some newsprint and bookpaper machines have reached a speed in excess of 1500 fpm, they, as well as the fast tissue machines, are presenting a significant noise problem. The current record operating speed for a newsprint machine, for example, is 2118 fpm, at Bowaters Southern Paper Corp.'s plant in Tennessee, and new machines designed for 2500 fpm are being installed in the industry.

Says Dr. Davis: "The Thiessen or Beloit drilled roll will probably become a part of these new machines, and Kimberly-Clark is planning to have this installed in any it purchases."

He adds that the company has experimentally checked the drilled roll on a model basis and found it to work. "It can quiet any of the rolls to the point where they cannot be heard," he claims.

Until it buys new machines, Kimberly-Clark is going to employ vacuum transfer and the Abbott and Kraus silencer on all of its newsprint machines at its affiliated Coosa Pines, Ala. plant. It has already tested them out successfully on one bookpaper machine at its Niagara, Wis. mill.

### Specially designed booths

However, in its partially owned Spruce Falls Power & Paper Co., Ltd. newsprint plant in Ontario, where it has not been successful in adapting the Abbott and Kraus silencer to the particular machines, it is using movable booths of its own design. These booths are set in the aisle between the machines that are established in right- and left-hand pairs.

The booths are made of double wood acoustically-treated walls, ceiling and floors, with double glass windows so that the men can look out on the machines on either side. They have steel frames, allowing them to be picked up out of the aisle by an overhead crane and carried to the end of the machines.

Of course, when a booth is removed temporarily, the men concerned with the affected machine and those watching the machine on the opposite side of the aisle are subjected to the noise. But, as yet, there is no remedy for this.

The booths are 7 ft. wide, 7 ft. high, and 11 ft. long. They are air-conditioned, and have telephones connected with the rest of the mill primarily for the convenience of foremen and supervisors. The men inside the booths can eat their lunch in them while watching the machines — an advantage in a continuous operation like papermaking.

Says Dr. Davis: "The machines have run better since the installation of the booths, possibly because the men do not readjust them so frequently."

While inside the booths, the men have no need to wear ear muffs or ear plugs, as noise levels are below 90 decibels.

Spruce Falls has been successfully using these booths of its own design for about a year. "So far as is known," states Dr. Davis, "only one other company has attempted to design and use booths. The difficulty may be in designing one that will be effective in noise reduction, and, at the same time, be considered economically feasible in construction."

### Converting machines pose a special problem

When it comes to tissue converting machines, which have only become a noise problem within the last year or two since they were speeded up considerably, Kimberly-Clark's technical research associate declares: "There is no way of avoiding the noise except by covering the machine with a house or getting the operator away from it."

Not only does the converting equipment Kimberly-Clark uses to change a roll of creped wadding into toilet tissue or interfolded facial tissues tend to get noisier as it gets faster, but so do other kinds of converting apparatus used by other companies, such as paper bag making machines and die cutting machines.

To reduce the noise from its converting machines, Kimberly-Clark is working from the angle of redesigning the machine, or else the plant operation, to get the operator out of the noisy area. This is a long-range goal.

In the interim, the company is covering the machines with houses it has designed. In this, it is a bit out in front in the field, and probably the only firm in the industry using a house for this purpose.

Kimberly-Clark's house is made of heavy sheet steel lined with acoustical material, and it sits on a rubber mat which is acoustically isolated from the floor. It contains double glass windows so operators can see the machine operation and has access doors allowing the operator to fix the machine. The house can readily be picked up and lifted off the machine by an overhead crane to permit alterations on the machine.

The company is finding the houses an acceptable means of reducing converting machine noise.

### Noise at the saws, chippers, drum barkers

Of course, not the least sources of noise in a paper mill are the saws, chippers, and drum barkers. To reduce this noise, Kimberly-Clark is attacking the problems from the angle of redesigning the process and feels that the optimum solutions lie still in the future.

Meanwhile, it is redesigning two wood rooms, making them both quieter and more efficient than earlier models.

Dr. Davis believes there is a need to isolate the drum barkers, which are now frequently located in the woodroom or close to it and "make a noise like Niagara Falls." He prefers putting them outdoors, where there will be fewer people around than inside the wood room.

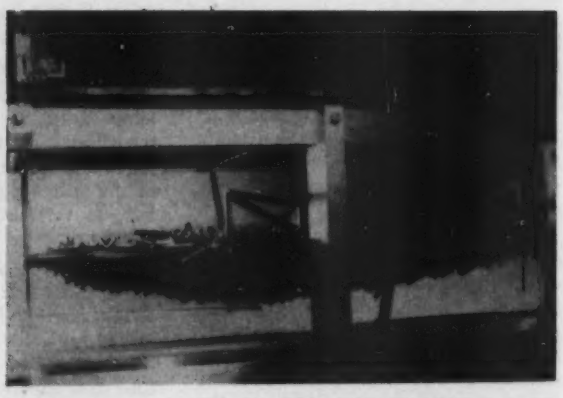
Of these noise makers in general, he states that in some instances it would be possible to use a booth to protect the operators. In other cases, it might be necessary to design a different kind of equipment, so, for example, "you can get a log to the saw without an operator having to remain close to the saw."

Meanwhile, in the vicinity of chippers, slasher saws and hammers, in some of Kimberly-Clark's mills the men consistently wear ear plugs.

Recently the company instituted an audiometric testing program of all new employees as a means of protection to both the firm and the workers. This program is expected to become a part of the annual physical check-up of employees.

As Dr. Davis says: "Once management and engineers are convinced there is a noise condition that deserves correction, there is no insoluble problem. The solution requires time, effort, and money."

Looking upstream in flume. Set-up to measure downstream and side thrust of jam to determine coefficient of friction (wood to walls). Boom and floating wall are connected to cantilever arms to which strain gauges are bonded



View through side of glass wall of flume showing profile of jam of 4 ft. wood and jam depth gauge. Floating plastic walls isolating jam from flume walls can be seen. Trusses keep floating walls separated and parallel to each other

# "Project Logboom"

## — seeks to cut waste in holding ponds

"PROJECT LOGBOOM" reaches from the scholarly atmosphere of Queen's University in Kingston, Ont., to the bumping and grinding of pulpwood holding grounds in Ontario, Quebec and New Brunswick. Object of the far-flung research is to eliminate waste in the traditional method of storing logs for mill use.

Sponsored by the Pulp and Paper Research Institute of Canada, the project is being conducted by Prof. R. J. Kennedy of Queen's University, assisted by G. T. Keys and S. S. Lazier, hydraulic engineers on the University of Toronto faculty.

The holding grounds vary in size from chain-blocked backwaters holding a few square yards of logs to tremendous stretches of river bounded by elaborate fences — with rock pier anchors — containing hundreds of acres of floating timber.

The principal aim of the experimental program is to investigate losses resulting when rivers flood or when booms give way under the pressure of storms. It is estimated that the research will require from five to seven years.

### *Models implement studies*

At the outset of the research program it became evident that little could be accomplished by relying only on measurements made on full-scale holding grounds. The cost would have been extremely high without guarantee of success, and years might have been required to cover the full range of possible conditions (floods, storms, etc.).

It was decided therefore to construct exact-scale hydraulic models, in which basic information concerning holding grounds would be determined, and to perform spot checks on specially chosen field sites to provide correlation of field and laboratory results.

The model studies were originally undertaken by personnel of the Research Institute in laboratories of the National Research Council of Canada in Ottawa. However, space limitations forced removal of the equipment to Queen's University.

### *24-foot log pond*

At present, the hydraulic model facilities consist of a glass-walled flume 6 ft. wide and 24 ft. long. The bed of the flume is 30 in. above the floor, which facilitates visual and photographic studies. Water is supplied by two pumps of 4-cfs and 8-cfs capacity, respectively, through a 16-in. diameter line to two 8-in. diameter outlet pipes into the stilling box of the flume. The discharge is measured by orifice meters calibrated in place and controlled by finely adjusted valves in the outlet pipes. The water depth in the flume is controlled by six remotely-activated aluminum gates, and the head of water can be measured at one-foot intervals down the length of the flume by means of hoses connected to stilling wells, to which gauges reading to 0.001-in. are fastened.

A large supply of model logs to 20:1 scale have been procured. At present, there are approximately 150,000 model 4-ft. pulp sticks and 15,000 model 12-ft. logs. The sticks are of dry oak dowel stock cut with specially dulled cutters to simulate the weight and roughness of the actual wood. Weight is maintained by a coat of varnish, which also helps reduce surface tension.

### *Seven important measurements*

The first test series was designed to determine the characteristics of a river log jam restrained by a simple boom and to predict the force that would be caused by the jam under various conditions.

To accomplish this a large number of tests were performed in the model under a wide range of conditions (water velocity and depth). A model boom was strung across the flume, and — conditions of flow and depth being held constant — model logs were introduced into the water. The following measurements were taken:

(1) Discharge; (2) velocity upstream of the jam; (3) velocity under the jam; (4) depth of water up-

stream and downstream of the jam; (5) head of water built up behind the jam; (6) depth of jam, and (7) forces produced by the jam.

### Floating plastic walls

The force produced was measured by isolating the jam by means of floating plastic walls from the flume walls and by hanging the boom between the floating walls at the lower end. The upper ends of the floating walls were connected to ends of cantilever arms, on which Baldwin SR-4 strain gauges had been bonded. The cantilever arms were calibrated with dead-weights to permit measurements to an accuracy of 1/10-oz. The strain gauges are connected to strain recorders, and thus the build-up forces are recorded.

From these and similar tests it has been possible to compile sufficient information to allow the prediction of the force caused by a jam restrained by a boom straight across a river. The percentage of the force absorbed by the shores can be determined, the depth of the jam predicted. In addition, it is possible to estimate the length of the jam which will effect force on any given boom.

### Spring field tests

Each spring the project team has carried out tests on full-scale holding grounds in the field to provide checks on the laboratory work. A special device has been developed to measure the depth of the jam. Current meter readings are taken to determine velocity distribution and discharge; velocity measurements are made under the jams by means of a specially-designed pilot tube. In order to measure the force in the boom, dynamometers consisting of aluminum bars to which electric strain gauges have been bonded are inserted between boomsticks and in any guy wires extending from piers to boom, etc. The head of water across the jam is measured by water level recorders placed at various locations in, above and below the jam.

At the present time, the effect of piers in holding grounds and the force they withstand is being investigated in the model flume.

It is planned to actually measure the force taken by piers in the field. To accomplish this, a portable bulkhead has been designed and is under construction. It has four built-in pressure cells utilizing Baldwin SR-4 strain gauges.

### No rule of thumb

The general research program was launched in 1952 by the Pulp and Paper Research Institute. Up to that time most log boom designs had been based upon rule of thumb ideas or formulas lacking in scientific basis. The goal of the Institute was to provide information based on sound engineering principles that would allow the design of holding grounds under any conditions.

It was recognized that holding grounds could be divided into three broad classes: (1) those formed by a boom running directly across the river from shore to shore; (2) those formed by a boom running up the river parallel to one of the banks, and (3) those situated in tidal waters.

Also to be considered were the allied problems of towing wood and anchoring wood in open water.

# Use virus disease to kill forest insects

**▶ The Virginia pine sawfly has been successfully controlled with a virus disease spray—achieving 77 per cent to complete mortality in sprayed areas**

THE VIRGINIA PINE sawfly, an insect pest of pine trees in the eastern and central United States, has been controlled in localized areas with a virus-disease spray by U. S. Department of Agriculture scientists.

This achievement, coupled with earlier (1951) successful virus control of the European pine sawfly, leads Department scientists to believe that there is considerable hope for the eventual practical use of diseases against many forest insects.

Insect Pathologists S. R. Dutky, J. V. Thompson and C. G. Thompson of USDA's Agricultural Research Service and Entomologist J. M. Davis of the Forest Service obtained, as a result of several experiments carried out in Maryland pine woods in 1955, 77 per cent to nearly complete kills of sawflies with the virus sprays. Their tests further showed that the virus of the Virginia pine sawfly affected the European pine sawfly, and *vice versa*.

The chain of events leading to successful virus control of the Virginia pine sawfly began in May, 1954, when scientific examination of several severely damaged pine trees in Montgomery County, Md., revealed some of the sawfly larvae to be naturally infected with a virus. In their laboratory the scientists successfully preserved the virus from 30 infected larvae that they had collected, then developed techniques to rear and infect other Virginia pine sawfly larvae with this preserved virus. In this way, they built up over the winter of 1954-55 a bank of some 5,000 virus-killed sawfly larvae, each yielding about 50,000,000 virus-containing polyhedra (polyhedron-shaped granules that help protect the virus from inactivation).

In a typical field test last summer, a 2-acre area containing 38 insect-infested pine trees was sprayed from the ground, each tree getting dosed with a water suspension of 500,000,000 polyhedra.

Nine days after spraying, about half the sawfly larvae showed symptoms of infection, and on the 11th day, 77 per cent of the larvae collected were dead. Many of those that survived to spin cocoons were infected with the virus.

In laboratory tests to measure the interchangeability of the two sawfly viruses, the scientists found that the European sawfly virus was more deadly to the European pine sawfly than was the Virginia pine sawfly virus—causing 97 per cent as compared with 84 per cent mortality. Field use of the European pine sawfly virus against the Virginia pine sawfly resulted in 51 per cent control, as compared with 97 per cent control achieved with the Virginia pine sawfly virus.

# This is your life — with paper

**American Cyanamid's unique exhibit in honor of New York Paper Week presents varied role of paper and paper products in the past, present and future**

The basic fourdrinier process, a wasp nest, and a papyrus plant depict paper's historic beginnings. Spruce seedlings and a pulp wood log mark the first steps in the modern papermaking process

WHAT IS PAPER? American Cyanamid's educational exhibit explores the answer by beginning with the earliest raw materials and process, taking the viewer through today's methods of papermaking, and looking to the future's wide possibilities. One section of the exhibit shows the life of many of the different kinds of paper documents and products that provide a means of communication, comfort and pleasure in the lives of people—from birth certificate and military discharge through stocks and bonds, a molded pulp decoy duck and travel folders. Paper clothing is displayed publicly for the first time in the "future" panels of the exhibit where also are found some new industrial uses. The role played by some 600 chemicals is suggested in another panel.

Wood chips and dry laps of bleached kraft pulp show principles of papermaking

First of three panels showing paper in everyday life from birth through marriage

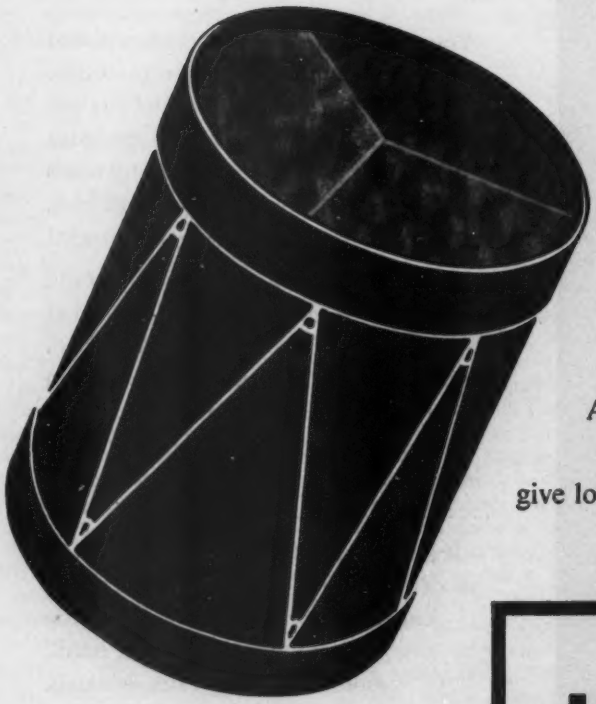
Paper dress, coveralls and bathing suit are dry cleanable, can be ironed

Paper mail bags, outdoor coverings and temporary shelter lie in the future

Melamine resin, wax size, rosin size are a few of the chemicals used in paper

# You can't beat HAMILTON Felts

## for easiest adjustment... reduced downtime!



Since making paper is so much more profitable for you than making felt adjustments, Hamilton Felts are *engineered* for no-sag, no-stretch *fit!*

And since 1858, papermakers have found Hamilton Felts give longest high-quality performance between changeovers.

**Hamilton**
**FELTS**

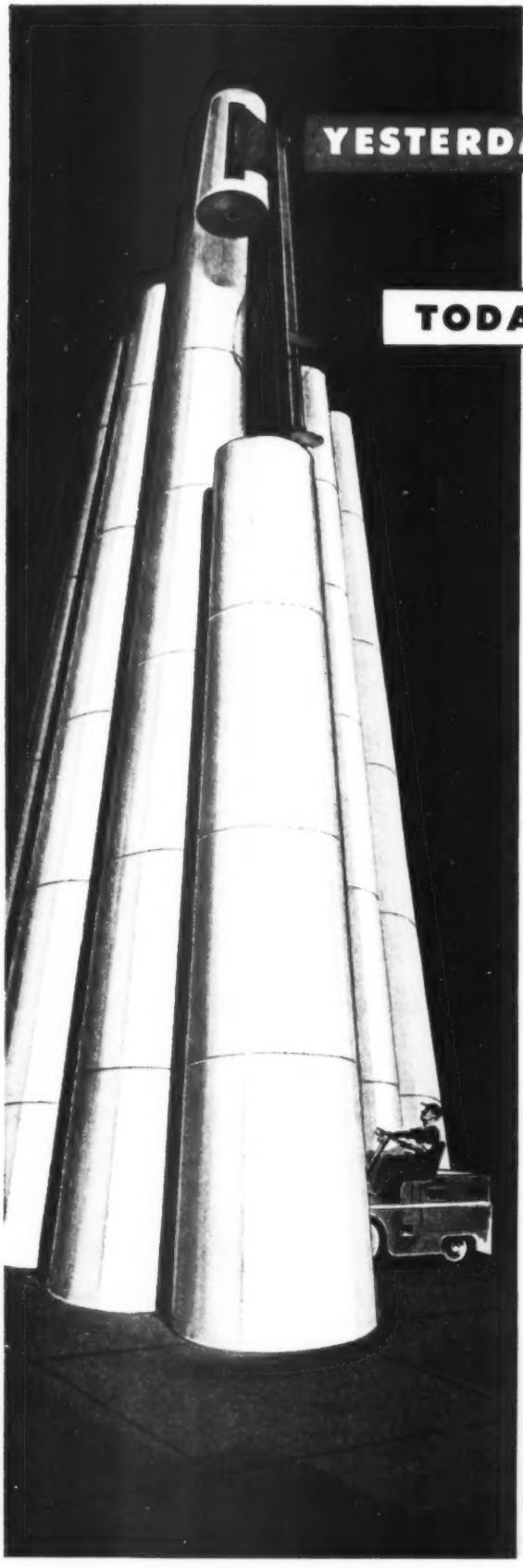
• *Win a New Stetson . . .*
*Give "Ham" a New Hat!*

• **HAM FELTZ says:**

"Send me *your* idea (a very rough sketch will do)—of the type of hat the best wet-end operators will wear this summer. If I wear it in future ads I'll send you a new Stetson."

MIAMI WOOLEN MILLS
Established 1858

**SHULER & BENNINGHOFEN, HAMILTON, OHIO**



**YESTERDAY . . . getting your share of the market**

**TODAY . . . expanding to meet the needs of the industry**

Your share of yesterday's market placed no great burden on your machines. But today, when demand has put the squeeze on supply, you need the extra margin of productive capacity that's built into every Puseyjones Machine. Tomorrow you'll need it even more!

At Puseyjones, there's a 90-year-old tradition of machine-building aimed at just one goal: To put you out ahead . . . years ahead . . . of your own production needs! That's why today's investment in a Puseyjones Machine is tomorrow's insurance — for top capacity production . . . ten . . . twenty . . . or thirty years ahead.

If it's time to add a new machine . . . or modernize an old one . . . let Puseyjones engineers work with you, to help you meet today's expanding needs, tomorrow's even greater demands. Write or call us today.

**THE PUSEY AND JONES CORPORATION**
**Established 1848 : : Builders of Paper-Making Machinery**
***Fabricators and Welders of all classes of Steel and Alloy Products***
**Wilmington 99, Delaware, U.S.A.**

THE SIGN OF TRADE MARK SUPERIOR QUALITY

# CURRENT COMMENTS

## Chemicals and paper . . . rising production . . . expansion to Europe

**The extent to which plastics are being integrated into papers is evidenced by the formation of a special group of domestic manufacturers producing papers with a polyethylene coating. The volume of such papers being produced here is such as to justify some of the largest paper companies setting up a program for an intensive study of the extent to which such papers are produced and marketed.**

Not the least interesting to a layman is the recent newspaper description of a new non-woven fabric produced by a large domestic paper company which is using cellulose wadding to surface a web of threads held together by an adhesive and bonded by heat and pressure. This is a paper combination of a new type of synthetic fabrics using nylon, rayon, acetates and the like. The experiments with the combination of cellulose and synthetic and similar threads have progressed so far that dresses and bathing suits have actually been made from the product. The threads on which experiments have been made include rayon and nylon and even glass.

### Polyethylene coatings

This, however, is only a preview of the possibilities of the merging of paper and pulp with chemicals. Polyethylene-coated papers are in the market in considerable volume, and growing in popularity because of the possibilities of use of such papers for purposes for which the paper alone would be impractical. The question whether such bonded non-woven materials are paper because of their resemblance to paper, or whether they are to be known as fabrics is yet to be solved. The use of cellulose will carry the production of such fabrics beyond the earlier types, which included such materials as Viskon, Lilion, and Masterlon.

How soon tailors will offer the American man plasticized paper trousers depends on the stylists, not on the producers. The idea is there, waiting for public acceptance.

The paper industry, however, is not constricting its paper production by turning its personnel over to research into the possibility of paper-plastic fabrics. It had been the early forecast of paper industry economists that the production in 1956 would not be more than a small percentage above the all-time record of 1955. The first quarter, however, sees output keeping up to a staggeringly high percentage of capacity. When industry reports show the industry operating at more than 100 per cent of capacity, it means that to normal rated capacity of six 24-hour days a week is being added Sunday operations. The demand is not abating, and there seems to be no sign of inventory accumulation. General price increases for kraft have been announced by many companies, usually about $10 per ton, and there have been some comparable increases in book paper prices.

What is more important, the price stiffening has not curbed buying. Final figures for production in 1955 have been announced by the Bureau of the Census, which shows a total of 30,896,748 tons, a figure somewhat higher even than the unofficial industry statisticians. Of this total, 12,826,496 tons was paper, 13,749,273 tons paperboard, the balance being wet machine board and construction boards and papers.

### Emigration

An international development program shows United States paper industry capital invading the European field, not confining its expansion to the Americas. The great Bowater organization and the giant American Scott Paper Co. have set up a new company to succeed St. Andrew Paper Mills, a British toilet and sanitary paper producer. The new company will expand the production of these grades to produce papers both under the Scott brands and those already known in the British Isles as a St. Andrew product. Scott has also begun expansion in Latin America and has acquired Canadian interests.

The optimistic attitude of American investors toward the future economic status of the nation is shown in the paper field by a sharp advance in the values of paper mill securities since the Eisenhower announcement of his candidacy for a second term. The paper mill issues did not drop seriously while his future plans were in doubt, leaving an already solid basis for advances when the official word was given of his candidacy.

### Stock and Bond Quotations

**New York Stock Exchange — Stocks**

| Closing Prices | March 9, 1956 | Feb. 9, 1956 |
|---|---|---|
| A.P.W. | 5⅞ | *4¼-4½ |
| Celotex | 39 | 34¼ |
| Same Pref. | 194⅞ | *193¼-20 |
| Certain-Teed | 27⅞ | 22⅝ |
| Champion P & F | 74 | 61¼ |
| Same Pref. | 107 | *106-107 |
| Chesapeake Corp. | 69¾ | *63-64 |
| Container Corp. | 73¼ | 74¾ |
| Same Pref. | 103 | 102 |
| Crown Zellerbach | 59¼ | 55½ |
| Same Pref. | 103½ | 103¾ |
| Dixie Cup | 54¼ | 53 |
| Eastern Corp. | 32½ | 27⅛ |
| Federal Paper Board | 33⅜ | 30¼ |
| Robert Gair | 33⅜ | 30¼ |
| Same Pref. | 110½ | 109 |
| Great Northern | 95½ | 97 |
| Hammermill | 38⅛ | 38 |
| International | 123¼ | 109 |
| Same Pref. | 106 | *105¼-106½ |
| Kimberly-Clark | 47¼ | 45⅜ |
| MacAndrews & Forbes | 44¼ | 44¼ |
| Marathon | 39⅝ | 35¾ |
| Masonite | 40¾ | 35⅝ |
| Mead Corp. | 75½ | 71 |
| Same Pref. | 101½ | *101-102½ |
| Same Sec. Pref. | 84 | *79-84 |
| Minnesota & Ontario (New) | 36 | 67¼ |
| National Container | 25⅛ | 22⅞ |
| Same Pref. | 45⅛ | 39¾ |
| Oxford Paper | 44⅛ | 36¾ |
| Same Pref. | 101 | 100⅛ |
| Rayonier Inc. | 38⅞ | 36¾ |
| Rhinelander | 47½ | 39⅜ |
| Scott Paper | 75 | 67½ |
| Same $3.40 Pref. | 93 | *92¾-93¼ |
| Same $4.00 Pref. | 105 | *104-105¼ |
| St. Regis | 48⅛ | 41⅜ |
| Same Pref. | 104¼ | *104-105½ |
| Sutherland | 48⅛ | 46¾ |
| Union Bag & Paper (New) | 34¾ | 95 |
| United B. & C. | 25½ | 22¾ |
| United Wallpaper | 2½ | 2 |
| Same Pref. | 24 | *19⅜-21⅛ |
| U. S. Gypsum | 64¼ | 55¾ |
| Same Pref. | 179 | *179½-182 |
| West V. P. & P. | 54 | 44¾ |
| Same Pref. | 106⅛ | *106¼-107⅜ |

**New York Stock Exchange — Bonds**

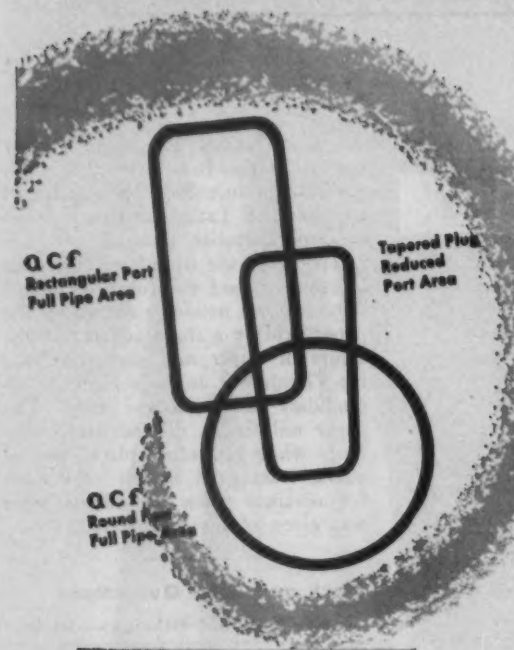
| | | |
|---|---|---|
| A.P.W. 5% | — | — |
| Celotex 3¾% | — | — |
| Champion P & F Co. 3¼% | 98 | — |
| Mead Corp 3% | 97 | |

**American Stock Exchange — Stocks**

| | | |
|---|---|---|
| American Writing | 21 | 20 |
| Brown Co. | 21⅛ | 18⅛ |
| Puget Sound | 71 | 70 |

*Closing Bid and Asked Prices.

# BEFORE YOU BUY ANOTHER PLUG VALVE...




# COMPARE THE PORT OPENINGS!

acf Plug Valves are backed up by Proof-of-Performance in every Processing Industry!

Turbulence! Loss of head pressure! These can present real problems when handling slurries and other viscous liquids! And because they are ordinarily the result of valves with "funnel action"... it pays you to make sure that the port opening has the same area as the pipe itself!

Pipe-matching port openings! This is only one of the reasons why more processing engineers than ever before are swinging over to acf Round Port Valves and Rectangular Port Valves. Other features, such as split-second, quarter-turn shut off...specially designed TEFLON* GASKET to prevent head leakage... all add up to lower maintenance costs and fewer work stoppages.

**WRITE TODAY** for descriptive Catalog E-8, acf Industries, Incorporated, Valve Division, 1501 E. Ferry Avenue, Detroit 11, Michigan

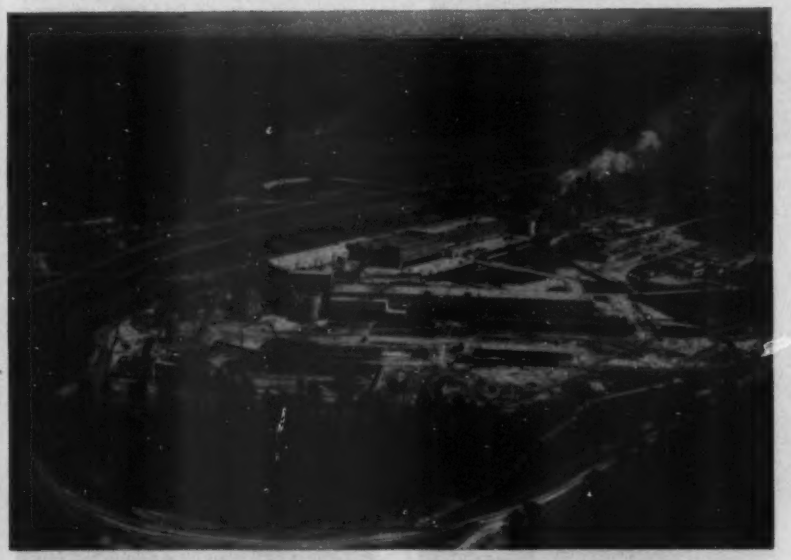
**GET YOUR COPY** of the acf Lube Manual, a complete description of lubricants and service recommendations. Ask for Manual No. 3.

*DuPont Tradename

acf CYLINDRICAL FULL PIPE AREA **PLUG VALVES**

# NEWS of the INDUSTRY

## Crossett's New Mill in Operation . . .



AERIAL VIEW of the Paper Mills Div. of Crossett Co. shows in the foreground the new $16,000,000 bleached food board mill that has recently gone into operation. The Crossett, Ark. plant produces 150 tons per day on a Beloit Iron Works machine. Directly behind the new operation is Crossett's kraft paper mill, which was built in 1937 and expanded in 1950

### CZ Expands Research on Columbia River Pollution

Dr. Herman R. Amberg, a nationally known authority on industrial waste problems, has been named by Crown Zellerbach Corp. to head a company research team in a continuing microbiological study of the Columbia River. His first assignment will be a study of the causes and possible remedies for slime fungus growth in the river.

The project was announced by G. H. Gallaway, resident manager at Camas, Wash., as another step in the firm's program to find effective methods of furthering stream improvement. The research team is to be on the staff of Dr. W. W. Moyer, Crown Zellerbach director of research. Prior to accepting the research assignment, Dr. Amberg was West Coast resident engineer for the National Council for Stream Improvement Inc. at Corvallis, Ore.

It is planned to begin the research project with laboratory bench studies in CZ's Central Research Department at Camas. There, under controlled conditions, water containing various mixtures of pulp mill waste and domestic sewage will be recirculated through troughs to determine the growth of slime under different conditions of flow and temperature. The researchers will make continuing analyses of samples of river water taken from various points in the Columbia. This study will continue until a significant trend is established.

#### $1,250,000 in 15 Years

While the intial project concerns the Columbia River area alone, Dr. Amberg and his staff will conduct studies for the company in all its operating regions.

During the past 15 years, Crown Zellerbach has invested approximately $1,250,000 in plant installations and research studies designed to eliminate or reduce water and air pollution that may result from chemical pulping processes.

CZ, for instance spent $500,000 in 1952 converting its Lebanon, Ore. mill to an ammonia base process. This permits the evaporation and burning of waste liquor. At West Linn, more than $150,000 has been spent to install ponding facilities to impound waste liquors for later discharge at high water periods under controlled conditions.

### Chillicothe Expansion Includes New Machine

Approximately $7,000,000 will be spent by Chillicothe Paper Co. in an expansion program calling for the installation of a new paper machine and the construction of a new finishing building. The Chillicothe, Ohio firm, a subsidiary of Mead Corp., estimates that the project will require more than 18 months.

The new machine, the firm's fourth, will be a Rice Barton unit for the production of offset and high-grade book papers. The fourdrinier wire will measure 188 in. in width and will be capable of producing a 174-in. sheet. The machine will boast a standard Rice Barton removable fourdrinier.

Installation engineering is to be handled by Charles T. Main.

The new finishing building will measure 290 by 200 ft. The two-story yellow brick structure will have glazed tile interior walls. Finishing operations, which are now located in the old mill, will be brought together in the new building.

### Mechanical Logger Announced by CPPA Woodlands Section

The invention, perfecting and commercial production of a mechanical logger was announced recently by R. M. Fowler, president of the Canadian Pulp & Paper Association. Five of the new machines are already at work in the woods: two in western Ontario on the operations of Ontario Paper Co. Ltd., and three in Quebec on the limits of Canadian International Paper Co. and Anglo-Canadian Pulp & Paper Mills Ltd.

The logger—first of its kind—will speed the movement of the pulpwood harvest from the woodlands to the mill. It is 18 ft. long and 9 ft. high and moves on four 6-ft. tires over any

kind of terrain. It carries 1½ cords of pulpwood, about 3½ tons, which it picks up, loads and dumps mechanically.

The newly-devised logger is both "articulating and oscillating," which means that all four wheels are always on the ground. Thus, the machine—with its four-wheel drive, four wheel brakes and four-wheel steering—is always under the complete control of the operator.

Midway between front and rear wheels is a universal joint that permits the front wheels to swing around almost at right angles to those in the rear. Thus, the logger is steered, not like a truck, but by means of the articulation that permits it to turn around practically on its own length.

The development of the new machine, demanding an outlay of $350,000, was financed by a group of pulp and paper firms and carried out by the CPPA Woodlands Section. The five experimental units were built by Bonnard Mfg. Ltd. of Montreal. They are to be produced commercially by Clark Equipment Co. at a plant now under construction at St. Thomas, Ont.

## Dierks to Use B-C Machine

Dierks Paper Co., a subsidiary of Dierks Forests Inc., will install a Black-Clawson fourdrinier machine in its proposed kraft liner board mill at Pine Bluff, Ark. The machine order was placed through Rust Engineering Co., which is designing, engineering and building the mill.

Designed for a daily production of 150 tons of high-grade kraft liner board, the machine will feature a Bagley-Sewall 166-in. permanent cantilever fourdrinier. The suction couch is to be mounted as an integral part of the cantilever mechanism to make possible quick wire changes.

The press part will consist of a suction first press and a plain second press. Suction rolls for the couch and first press will be of B-C design.

Three sections of 60-in. double-deck dryers, a size press, two calenders and an Autoflyte "36" reel will comprise the balance of the machine. The entire unit, from couch to reel, will be driven through B-C heavy-duty spiral bevel gear drives.

## Bowater and Scott Form British Subsidiary

Scott Paper Co. of Chester, Pa., and Bowater Paper Corp. Ltd. of London have formed a jointly-owned firm to manufacture and distribute in Great Britain products similar to those produced by Scott. (The Pennsylvania firm turns out items such as toilet tissues, paper napkins, facial tissues, wax paper, paper towels and industrial wipers.)

The enterprise, which will be known as Bowater-Scott Corp., will be the successor to St. Andrew Paper Mills, which was acquired as a subsidiary by Bowater Paper in 1955. Present expansion plans include the construction of a tissue plant.

## U. S. Newspaper Circulation Up

Despite the current newsprint shortages, daily newspaper circulation in the United States broke all records during 1955, according to N. W. Ayer & Son's recently published "Directory of Newspapers and Periodicals."

Combined circulation of English-language dailies by the end of the year reached 55,837,000, a jump of close to 1,000,000 copies per day over 1954. It was the largest increase in five years.

Evening newspapers had a daily circulation of 33,720,000, up 800,000; morning circulation was up 90,000 at 21,327,000. Sunday newspapers had a circulation of 46,044,000, up more than 220,000.

Counting both English- and foreign-language newspapers published in the United States, there were 1498 evening papers, up 13; 336 morning papers, down 34; 549 Sunday papers, down 25, and seven all-day dailies, up two.

KVP POWERHOUSE during modernization project costing $2,000,000

CONDENSER FOR 7500-kw turbo-generator is hoisted into powerhouse

## KVP Modernizes Power Plant

A 900-psi industrial boiler—said to be the first in southwestern Michigan—has been placed in operation at the Parchment mill of KVP Co. Soon to be put "on the line" at the plant is a 7500-kw turbo-generator capable of supplying the power needs of a city of 5000.

Installation of the boiler—a unit equipped with four pulverized coal burners for an hourly capacity of 200,000 lb. of steam—was started more than a year ago.

Combined cost of the boiler and turbine has been put at $2,000,000. The boiler was purchased from Combustion Engineering Inc., while the turbine is a General Electric product.

Addition of these units represents the first step of a long-range program to modernize the KVP power generation system. Heretofore, the power plant consisting of eight boilers of varying age was capable of producing 380,000 lb. steam per hour. The new boiler together with three older units that will continue in operation will add about 120,000 lb. to capacity.

At a recent meeting of KVP directors, a second boiler and turbo-generator unit, similar to those described above, were approved. Installation is scheduled for the near future.

Installed to work in conjunction with the new boiler was a modern coal-handling system. Coal is automatically dumped from rail cars, magnetically cleaned of foreign material,

carried by moving belt into the power house, crushed and pulverized and finally fed to the boiler. (Coal of diversified quality can be used.)

**No Smoke Nuisance**

To eliminate nuisance from smoke, KVP installed the latest in flue ash collectors, a unit that captures 94 per cent of all airborne particles before they leave the stack. Dust and soot in the boiler are also collected by a vacuum ash-handling system and stored in a 150-ton silo, thereby eleminating the need for daily removal.

Additional equipment was installed to treat the 11,000 daily gallons of water used by the power unit. Included were water softening machinery and deaerating equipment.

Equipment suppliers in addition to Combustion Engineering and General Electric include: **Ingersoll Rand Co.**—condenser unit and boiler feed pumps; **Cochrane Corp.**—deaerator and water softening equipment; **Clarage Fan Co.**—forced and induced draft fans; **Air Preheater Corp.**—air preheater; **Prat-Daniel Corp.**—mechanical dust collector; **Diamond Power Specialty Corp.**—soot blowers; **Fairfield Engineering Co.**—coal-handling system and bunker; **United Conveyor Corp.**—ash-handling system; **Hagan Corp.**—combustion control and feedwater control; **Midwest Piping Co.**—piping; **Swartwout Co.**—PRV and desuperheating stations; **Stock Equipment Co.**—coal scales; **Johns-Manville**—heat insulation; **Niles Steel Tank Co.**—stack, and **Hall Laboratories**—water consultant.

## *St. Regis Overhauls No. 5 at Deferiet, Acquires Two Converters*

St. Regis Paper Co. has overhauled No. 5 paper machine at its Deferiet, N. Y. mill. The unit is one of the firm's two original machines still in operation. It has produced more than 400,000 tons of paper since its installation in 1901.

The five-day overhaul was under the direction of Maintenance Superintendent Wendell Dickhaut and his staff. The project was the most extensive repair and modernization program ever undertaken on No. 5. One of the results is expected to be a 15 per cent boost in production over the old daily figure of 30 tons.

Included in the improvements were

**CHEMLON YARN PACKING STYLE C-30 Made of TEFLON* FIBER BY "JOHN CRANE"**

Chemlon Yarn Style C-30 extra tough packing gives you two important advantages not provided by other types of braided or molded Teflon packing: 1) positive sealing efficiency at high peripheral speeds; 2) cooler running stuffing box under severe service conditions.

Style C-30 can be used to handle the most destructive acids, alkalis or solvents. The excellent thermal properties of Teflon, combined with the softness, resiliency and fluid retentive properties of fine fiber construction, adapt it to high temperature conditions to +300°F. The packing is made firm and dense by means of a special process which eliminates *large* voids.

HERE'S PERFORMANCE PROOF:—Fluid handled: 45% $H_2SO_4$ (impure) at 170°F.—Operating conditions: 1¼" pump shaft at 1700 rpm. or 555 fpm. peripheral speed. Results: 46 days good service. Previous best service record 7 to 10 days.

Chemlon Yarn Packing Style C-30 is available in spool or coil form, in a wide range of sizes from ⅛" up. *Can be lubricated with Teflon suspensoid or various types of lubricants.*

**Send for Bulletin No. P-321. Crane Packing Co., 6450 Oakton St., Morton Grove, Ill., (Chicago Suburb). In Canada: Crane Packing Co., Ltd., Hamilton, Ont.**

*DuPont Trademark

JOHN CRANE CRANE PACKING COMPANY 38 YEARS INDUSTRIAL PROGRESS

OFFICES IN ALL PRINCIPAL CITIES

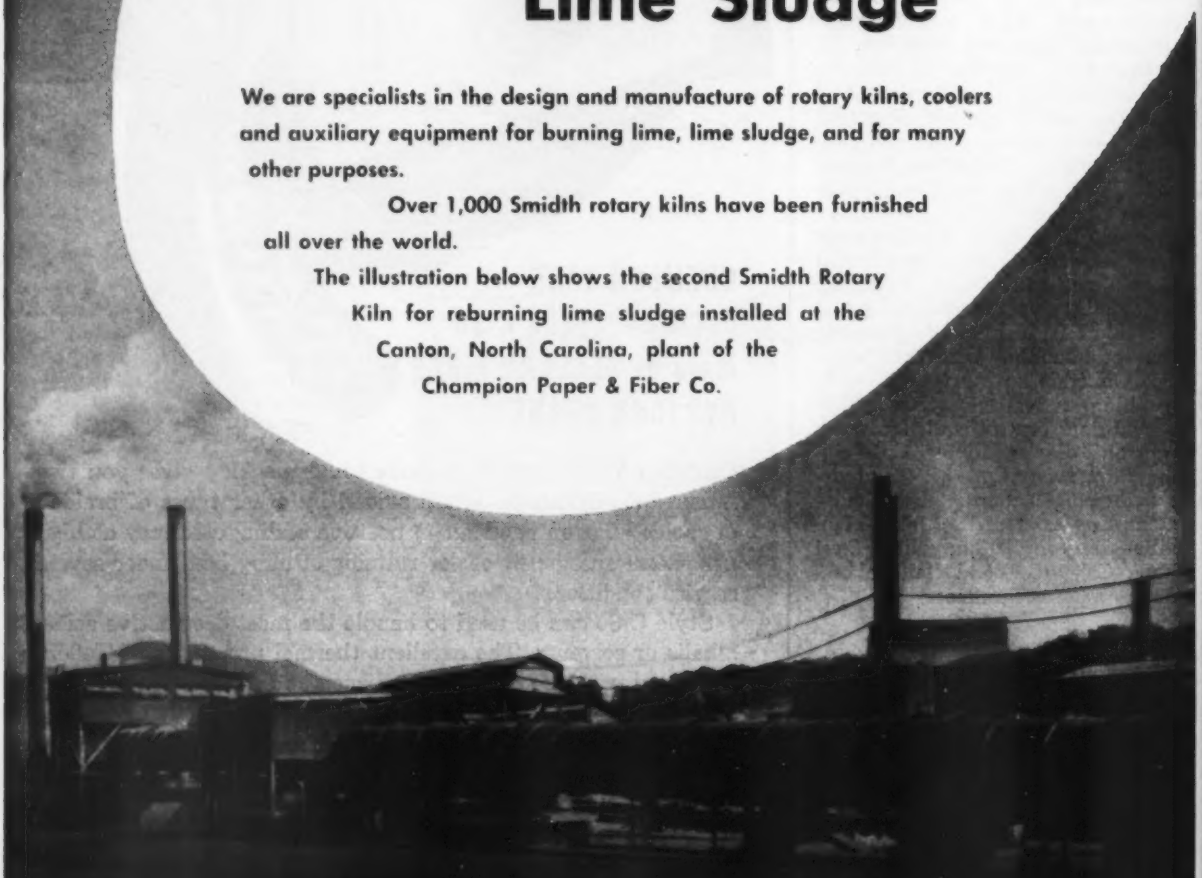
# SMIDTH Rotary Kilns

## For reburning Lime Sludge

We are specialists in the design and manufacture of rotary kilns, coolers and auxiliary equipment for burning lime, lime sludge, and for many other purposes.

Over 1,000 Smidth rotary kilns have been furnished all over the world.

The illustration below shows the second Smidth Rotary Kiln for reburning lime sludge installed at the Canton, North Carolina, plant of the Champion Paper & Fiber Co.



F. L. Smidth & Co., A/S
Vestergade 33,
Copenhagen K, Denmark

F. L. Smidth & Co.
*Engineers and Machinery Manufacturers*
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England

F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co. (Bombay) Ltd.
42 Queen's Road
Bombay, India

# The Beloit Album

**Engineers at work; an efficient roll filter; noise abatement; and other items of interest and significance to the world of paper as recorded by the Beloit camera's roving eye**

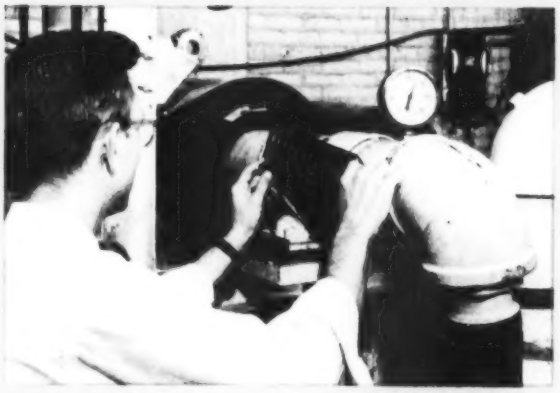
**LARGE, LIGHT DRAFTING ROOM** at Beloit Iron Works—one of five in Beloit's huge engineering department—is devoted entirely to press sections and suction rolls. In the foreground are assistant chief engineers A. A. Neese (*left*) and D. A. Ely. Behind them are others of the skilled engineering staff involved in the production of outstanding paper machinery. Literally thousands of engineering and drafting hours go into each high-speed, high-production machine designed and built by Beloit.

**SCALE MODEL** of the Beloit Roll Filter is examined by Beloit vice-president Lloyd Hornbostel (*left*) and sales manager D. R. Simonds. Filter provides efficient full filtering without formation of heavy sludge deposits, saves installation space, cuts oil costs and laborious filter changing.

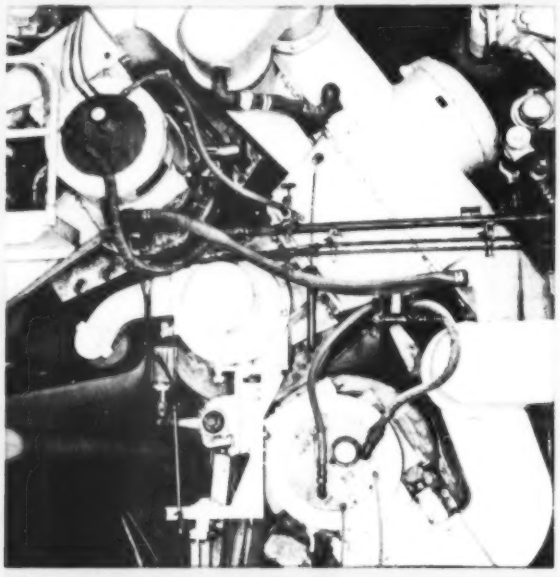
**ESCANABA PAPER CO.'S** resident manager G. S. Douglas (*r.*) and O. C. Christiansen, superintendent (*center*), check over their new press section on Beloit's erecting floor with Beloit's assistant sales manager F. G. Ramsden. Customers checking work in progress are always welcome.

# Noise Abatement

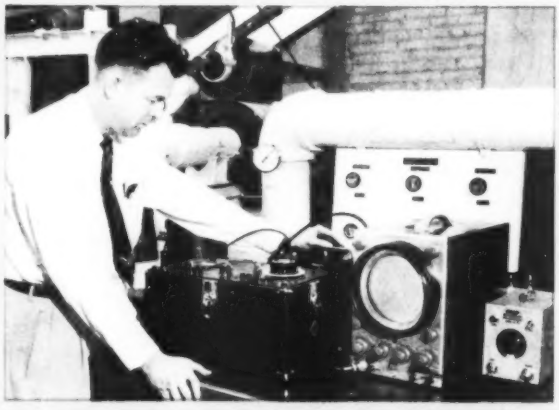
An important part of Beloit's design development program has been devoted to noise abatement. Both in extensive laboratory setups and in actual mill situations, Beloit engineers have employed the most modern recording and experimental equipment. As a result of this program Beloit is able to offer equipment which will effectively reduce suction roll noise on running machines. On new machines the noise can be controlled very effectively with newly developed silencers and drilling patterns. A continuing study of the problem is being made. Equipment and experiments relative to noise abatement are shown below and at the right.



**SILENCER** is here shown being readied for installation in an experimental suction roll by Beloit engineer J. F. Atkins. Beloit research engineers have designed and tested countless suction roll silencer patterns in an effort to reduce noise on all types of suction rolls.



**TWINVERPRESS** on Beloit 290" newsprint machine, Great Northern Paper Co., East Millinocket, Maine is equipped with one type of Beloit silencer. Beloit engineers are continually checking mill installations in a determined effort to further reduce suction roll sound levels.



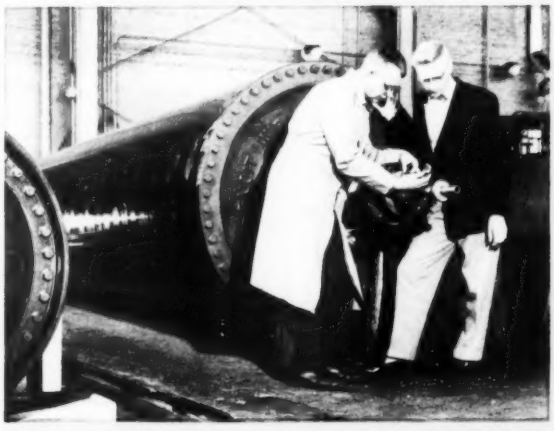
**FUNDAMENTAL STUDY** of noise generation has been conducted by C. B. Dahl, Beloit research engineer. In background, Beloit's experimental press section can be seen as set up in laboratory. This press operates at speeds in excess of 3000 fpm at 20 inches vacuum.

**A FRIENDLY PIPE** is smoked by English visitor Sir Robert Sinclair of Imperial Tobacco Company (of Great Britain and Ireland), Ltd. and St. Anne's Board Mill Company, Ltd. in a conference with executives of Beloit Iron Works. Seated (*l. to r.*) are Beloit chairman E. H. Neese, Beloit vice-president W. S. Wood, Sir Robert Sinclair, and Beloit president H. C. Moore.

**3000 FEET PER MINUTE** registers on tachometer held by Beloit engineer C. H. Hillman. This reading was registered during a recent test on newsprint dryers to check the effects of positive condensate evacuation and steam fit behavior at speeds up to 3400 feet per minute.

**BELOIT INTERNATIONAL** Corporation C. A.'s vice-president G. J. Bertrand (*right*) discusses the foreign market situation with Beloit assistant secretary H. E. Tower. M. Bertrand's Paris office is the focal point of Beloit operations in Europe and the Scandinavian countries.

**BOWATERS SOUTHERN** Paper Corporation's project engineer J. F. McInnis (*r.*) gets first-hand progress report on Bowaters' new newsprint machine. Others (*l. to r.*) are T. I. Vickerman, Beloit engineer; A. G. Olson, sales engineer; and J. D. Shaver, Bowaters engineer.



**60" DRYER** gets final check from R. Reindl (*l.*), dryer shop foreman, and J. R. Clothier, sales department. Beloit dryers get special attention during shipment—rugged protective coating, waterproof paper wrap on exposed surfaces, exacting care in loading for safe delivery to mill.

**STROBOSCOPIC BALANCING** in Beloit Iron Works roll shop finds roll balancer E. Stretz adjusting the pickup to achieve perfect balance. By this means, Beloit roll balancers can determine values to within a fraction of an ounce, and balance rolls with a minimum of setup time.

*your partner in papermaking*

# BELOIT

## PAPER MACHINERY

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS., U.S.A.

*WHEN YOU BUY BELOIT..YOU BUY MORE THAN A MACHINE*

***An Important***—and to many people surprising—statement about the paper industry is headlined in this series of Beloit-sponsored ads (shown here in miniature) currently appearing in the *Wall Street Journal* and other publications.

These graphic reminders of Paper's practical, cultural, and economic importance to the U. S. are an extension of an educational campaign designed to emphasize the wide variety of "career" opportunities in the paper industry.

Every member in the paper field can help by proclaiming the facts about one of America's fastest growing and most essential industries.

Note: *A set of three posters (15" x 20") suitable for display on plant and office bulletin boards will be sent to you on request without charge—Beloit Iron Works, Beloit, Wis.*

*your partner in papermaking*

**BELOIT**

**PAPER MACHINERY**

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS., U.S.A.

*WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE*

the installation of a new rope carrier, a new Downingtown suction couch, a Pope-type reel and unwind stands, and new drives.

In other St. Regis developments, the firm has acquired 100 per cent of the capital stock of Ajax Box Co. of Chicago and of Chester Packaging Products Corp. of Yonkers, N. Y. Both transactions were through exchanges of stock.

Ajax will operate as a St. Regis subsidiary with its present organization and management. The Chicago firm manufactures corrugated shipping cartons in natural kraft board and colored board, single- and double-faced corrugated wrapping paper, embossed wrapping and cushioning material and corrugated and embossed display materials.

Chester Packaging Products produces unsupported polyethylene film used in the packaging industry; laminates and coats polyethylene to cellophane, foil and kraft paper, and manufactures extruded polyethylene pipe. The Yonkers firm will operate as a St. Regis subsidiary with its present organization and management.

St. Regis Paper has also announced it has acquired 100 per cent of the capital stock of Gummed Products Co. of Troy, Ohio. The latter firm, a leader in the gumming industry, will operate as a St. Regis subsidiary with its present organization and management. (The transfer was through an exchange of stock.)

### J-M to Build in Oregon

As part of its $30,000,000 expansion program in the Pacific Coast area, Johns-Manville will build an insulating board plant near Klamath Falls, Ore. The ultimate cost, including timberlands, may reach $12,000,000. Operation is expected by mid-1957.

The Klamath Falls plant will use a annual 50,000 cords of lodgepole or jack pine. The groundwood process will be utilized.

### Transformers Built in 4½ Days Prevent Shut-Down

Fast work in Rome, Ga., recently avoided a long mill shut-down in Westfield, Mass. A transformer failure had caused a slow-down at Stevens Paper Mills Inc., and the firm was losing thousands of dollars daily.

An order went out to the Medium Transformer Dept. of General Electric Co. in the Georgia city. Teamwork and planning at the GE plant resulted in the building of three medium transformers in less than five days—a job normally requiring seven weeks.

CONSTRUCTION proceeds at the Hinton, Alta. mill of North Western Pulp & Power Ltd.

### North Western P&P Project at Half-way Point

Construction has reached the half-way point at the Hinton, Alta. bleached sulfate pulp mill of North Western Pulp & Power Ltd. It is expected that pulp will be shipped in the spring of 1957.

St. Regis Paper Co., which owns half interest in North Western with North Canadian Oils Ltd., is directing the project, will manage the mill and sell the output.

Daily rated capacity is to be 430 tons of bleached pulp. Pulpwood will be drawn from about 2,000,000 acres of Crown lands under a lease granted by the Province of Alberta. The provincial government has granted a 14-year option on 2,000,000 additional acres in the event more wood is needed.

Uniform high-quality pulp is to be produced from lodgepole pine and white spruce by a new continuous process in Kamyr digesters. This will be the world's largest installation of these continuous digesters and the first in North America. Two chlorine dioxide stages in the six-stage bleach plant will produce a pulp of high brightness.

### Upper Michigan Sawmill Wastes Converted into Leather Tannin and Pulp

Solution of a serious waste problem in Michigan's Upper Peninsula was recently announced by the U. S. Department of Agriculture. The development provides new sources of paper pulp and tanning material.

According to the USDA's Eastern Utilization Research Branch in Philadelphia, every year thousands of cords of hemlock slabs are burned in the field or used as fuel, even though the bark is known to contain 10 per cent of sorely needed tanning material, and the wood can be converted into highly satisfactory paper pulp. Until recently no economical method has been known for achieving a clean separation of bark and wood so that each component could be used.

Several years ago the Eastern Branch laboratory was approached by Walter H. Koepp of the Forest Products Research Div. of the Michigan College of Mining and Technology at Houghton. He envisioned a thriving new industry for the Upper Peninsula.

Norman F. Roger and Edward L. Griffin Jr., chemical engineers at the laboratory, went to work. They came up with a possible solution: Since the specific gravity of the bark is 0.64 and that of the wood only 0.44, these two components could be segregated by air flotation if the slabs could be chipped in such a way that the wood and bark were almost completely detached from each other. After investigating a number of chipper types they found one especially designed for slabs that operated efficiently provided the slabs had been seasoned from seven to 10 months in the open to reduce moisture content to less than 20 per cent.

#### Pilot Plant Run

First in a small preliminary experiment and then in a larger pilot-plant run, hemlock slabs were shipped to Carthage, N. Y., for seasoning and chipping.

The chips were then sent to the Eastern Laboratory, where they were screened into five fractions on the

# MORE GENERAL CHEMICAL "ALUM"

## for America's Paper and Water Industries!

### *Announcing a New Liquid Alum Plant at Hopewell, Va.*

A 25th plant is now being added to General Chemical's coast-to-coast network of aluminum sulfate production centers! The new liquid alum plant at Hopewell, Va. will serve paper mills and water and sewage treatment plants in that part of the country . . . just as General's other facilities provide for needs of consumers near them.

### Expansion That Assures Continued Good Service and Dependable Supplies

General Chemical dry and liquid aluminum sulfate has long been the first choice of industrial and municipal users everywhere. They have found they can always count on General Chemical for the right grades made to their requirements, with the same uniform high quality lot after lot.

And—*equally important*—they know that General's policy of building its plants at locations convenient to consuming centers means fast service and a reliable near-by source of supply they can depend upon in emergencies and at all times.

This is a combination that can't be beat. That is why it is *good business to do business with General* for alum or any of the other basic chemicals listed below.

GC Allied Chemical

*Basic Chemicals For American Industry*

| | |
|---|---|
| Acids | Phosphates |
| Alums | Sodium Compounds |
| Fluorine Compounds | Other Industrial Chemicals |

## GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

*Offices:* Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cleveland Denver • Detroit • Greenville (Miss.) • Houston • Jacksonville • Kalamazoo • Los Angeles • Milwaukee • Minneapolis New York • Philadelphia • Pittsburgh • Providence • San Francisco • Seattle • St. Louis • Yakima (Wash.)

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

basis of size, after which the bark and wood fractions were segregated by use of an air-flotation specific-gravity separator.

Tests showed that this equipment was capable of segregating seasoned hemlock slabs into an 80 per cent bark product containing 10 per cent tannin, and a 95 per cent wood chip product. The slight contamination of the wood chips with bark did not prevent them from being made into fine bleached paper, since the bark was easily removed by pulp-cleaning devices. It was found that when the wood chips from the separator were made into pulp and cleaned they could be made into a sheet of bleached paper as "strong and clean as any obtainable from regular-run, mill-peeled hemlock pulpwood."

## CPPA Technical Section Elects New Officers, Makes Annual Awards

Dr. R. de Montigny

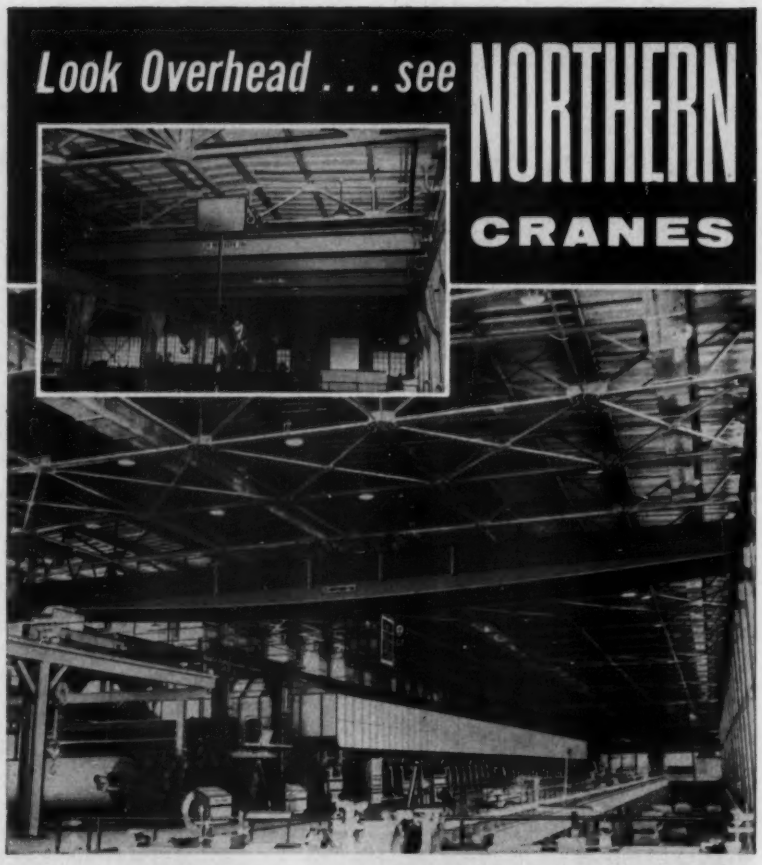
At its recent annual meeting in Montreal, the Technical Section of the Canadian Pulp & Paper Association elected Dr. R. de Montigny chairman of its executive council. Dr. de Montigny, who is technical director for E. B. Eddy Co. at Hull, Que., succeeds W. S. Cramp, resident manager for St. Lawrence Corp. Ltd., Three Rivers.

Elected vice chairman of the section was J. W. Wing, vice president of Gaspesia Sulfite Co. Ltd. at Chandler. Two new councillors named at the meeting are Dr. R. D. Duncan of Canadian International Paper Co. of La Tuque and Guy Minard, vice president of Spruce Falls Power & Paper Co. Ltd., Kapuskasing, Ont.

### Service and Safety Awards

Awards for outstanding service to the Canadian pulp and paper industry and to the authors of the best technical and scientific papers presented at the 1955 meeting were announced during the CPPA gathering. In addition, two competition awards for the safest pulp and paper mills were presented, as were two awards in the Section's gadget contest.

Honored for the most valuable con-


selected by leading paper mills

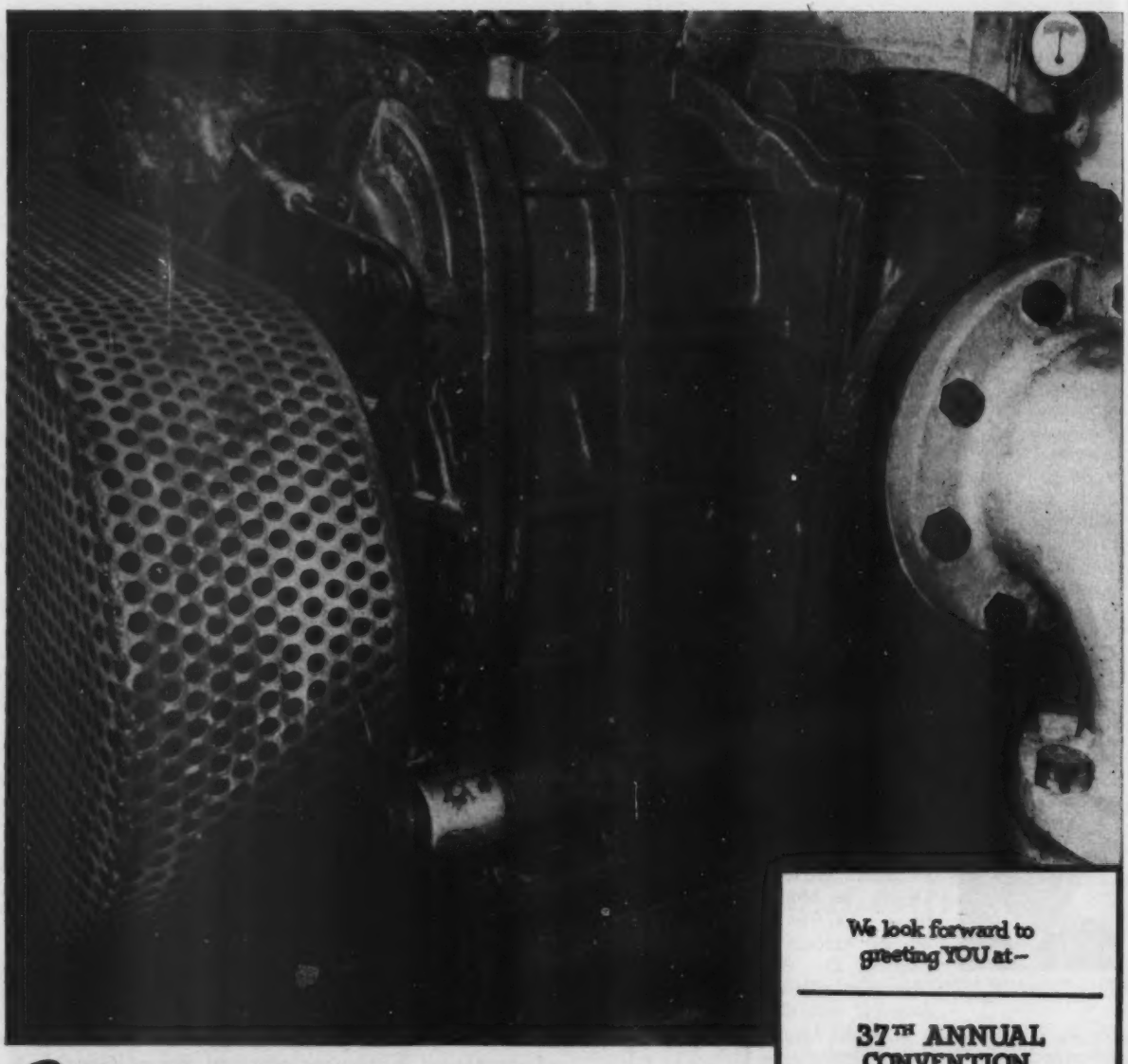
It is frequently said that there is no substitute for experience.

Rome Kraft Company's selection of NORTHERN CRANES for the machine, roll grinding, turbine and refiner rooms in its new plant at Rome, Georgia, reflects Northern's experienced responsibility for over fifty years in delivering the particular overhead materials handling service required in production type paper mills.

NORTHERN CRANES are fast, safe, dependable; designed and built for minimum maintenance, quick easy accessibility for service, for maximum efficiency of your invested capital.

NORTHERN MATERIALS HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.



# *Standardaire* pump solves drying and foaming problems . . . cuts maintenance for specialty paper producer

Uneven drying and heavy foaming problems resulting from vacuum fluctuations presented serious obstacles to Raybestos-Manhattan, Inc., in the production of its new, single-fiber asbestos paper.

A Standardaire vacuum pump, installed originally on a 4-month trial basis, entirely eliminated these difficulties. The unit, requiring only half of the area of the former pump, provided a constant vacuum, making possible an uninterrupted flow between the pulp vat and the final windup drum.

Now, after nearly four years of operation, often in excess of rated capacity, this unit still is in prime condition. No maintenance has been required other than lubrication at 3-month intervals.

The compact Standardaire offers greater capacity per pound of pump, with less power consumption, than other units of equal size and weight. Find out how they can help solve your problems. Write for your copy of illustrated bulletin B-154 which provides specifications and operating data.

We look forward to greeting YOU at—

**37TH ANNUAL CONVENTION**

AMERICAN PULP and PAPER MILL SUPERINTENDENTS ASSOCIATION

**JUNE 12 to 14**
**LAKE PLACID CLUB**
**ESSEX COUNTY, N.Y.**

**READ STANDARD**
CORPORATION

**BLOWER-STOKER DIVISION**
**370 Lexington Avenue**
**New York 17, New York**

tribution towards furtherance of the purposes of the Technical Section was G. E. Backer, mechanical superintendent for Consolidated Paper Corp. Ltd. at Three Rivers, Que., who won the F. G. Robinson Technical Section Service Award. The award was made in recognition of Mr. Backer's work as chairman for the past three years of the Mechanical Engineering Committee.

The I. H. Weldon Gold Medal for the best paper presented at the previous anaual meeting went jointly to Dr. K. C. Logan, Gunnar Gavelin and Jasper Mardon, all of Northeastern Paper Products Ltd. of Quebec, P. Q. Their presentation dealt with the effects of paper machine characteristics on paper uniformity.

The C. Howard Smith Gold Medal for the best paper submitted to the Technical Section during 1955 by a junior or student member was won by G. H. Snider of Canadian International Paper for his paper discussing the drying qualities of paper machine felts.

First prize in a gadget competition sponsored by the *Pulp and Paper Magazine of Canada* and judged by the Section's Mechanical Engineering Committee was won by H. C. Graham of Elk Falls Co. Ltd., Campbell River, B. C., for his special process of gluing newsprint wrapper. Second prize went to A. Booth of Canada Paper Co. in Windsor Mills, Que., for his improved paper winding mechanism.

Two shields were awarded for the safest pulp and paper mills in Canada to Quebec North Shore Paper Co., Baie Comeau, Que., and to the Newcastle, N. B. plant of Fraser Companies Ltd.

### Weyerhaeuser Research Expansion Nears Completion at Longview

Weyerhaeuser Timber Co.'s enlarged research and development facility at Longview, Wash., is scheduled for completion early in January. The expanded building is to be called Technical Center — Longview. The original structure was built in 1941 and has been known as the Development Center.

James R. Roberts, manager of the Technical Center, has reported the following staff appointments:

Dr. A. S. Gregory, formerly assistant manager of the Development Center, to be manager for applied research. H. A. McKeever, formerly chief of the center's mechanical engineering section, to be manager for process development. E. M. Williston, former chief of the center's applied physics section, to be manager of product development. A. S. Mark, former administrative section chief, to be office manager.

### Folding Box Industry Nears Billion-Dollar Mark

The folding paper box industry will soon join the select circle of billion-dollar-a-year businesses. Norman F. Greenway, president of the Folding Paper Box Association, declared at the group's recent 30th annual meeting that, "We are well on our way to becoming a billion-dollar industry. I don't know whether we will reach that goal this year or next, but reach it we will."

Constantly increasing demand by U. S. consumers for more and better packaging and the self-service retailing of products used in every-day living have been responsible for the rapid growth of the industry.

IAC

ASSOCIATED INDUSTRIAL CONSULTANTS

. . . Trained for the Special Problems of the Pulp and Paper Industry

- Maintenance "Control Center" Programs to reduce "downtime" and Establish "Par" for Maintenance Costs.
- Measured Work Standards for all Direct and Indirect Personnel including Maintenance.
- Wage Incentives, with emphasis on quality, for Pulp, Paper Making and Converting Operators.
- Wage Incentives for Supervision and Executive Levels.
- Installation of Industrial Engineering Departments.
- Systems and Procedures for all Clerical Operations.
- Production Control Systems and Procedures.
- Job Evaluation Programs..
- Complete Organizational Studies to define and balance responsibilities.
- Training Programs to upgrade supervision.
- Plant Layout and Materials Handling Methods.

*Write, wire or phone for further information on any one or all of these services.*

IAC

ASSOCIATED INDUSTRIAL CONSULTANTS

246 WEST STATE STREET TRENTON, NEW JERSEY

TELEPHONE: EXport 3-2063

# Recent Expansions in the Industry

**International Paper Co.'s**
Container Div. will build a plant in San Jose, Cal., for the production of corrugated fiber shipping containers. Planned capacity will be 36,000 tons.

---

**Bowaters Southern Paper Corp.**
has announced a fourth expansion stage at Calhoun, Tenn. A fiberboard mill will be built with an annual capacity of 120,000,000 sq. ft. The cost has been estimated at $5,000,000.

---

**Riegel Paper Corp.**
has announced a new common stock issue, the proceeds of which will be used primarily for expansion of the firm's North Carolina properties. Plans bleached food board machine and an increase in daily pulp capacity to 500 tons and acquisition of additional timberlands by the Carolina Div. Also, Riegel will purchase a paper machine now owned by Scott Paper Co. and located at the Riegel mill in Milford, N. J. Certain new auxiliary equipment will be added to the unit.

---

**Crown Zellerbach Corp.'s**
Western Waxed Paper Div. has opened a Boston warehouse for the storage of frozen food wrappers. It is the division's second such unit in the East. Overwraps are produced at Los Angeles and San Leandro, Cal., and at North Portland, Ore.

---

**International Paper Co.**
will spend $1,000,000 for improvements at its North Tonawanda and Niagara Falls, N. Y. plants. Much of the expenditure at the two mills—which yearly produce 150,000 tons of paper—will be devoted to machine rebuilds.

---

**St. Croix Paper Co.**
has broken ground at Woodland, Maine, for a $13,000,000 expansion of its newsprint mill. First structures scheduled are a machine building and a grinder building.

---

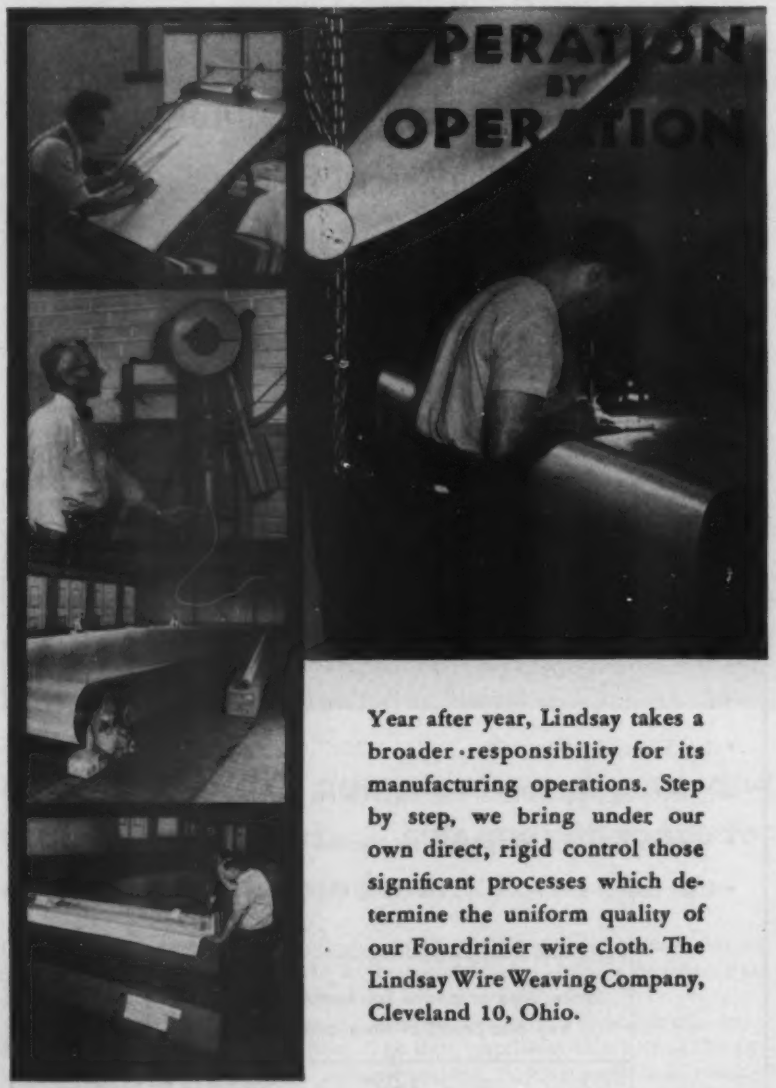
**Time Inc.**
has concluded negotiations with Houston Oil Co. for full title to East Texas Pulp & Paper Co. (of Evadales) and Southwestern Settlement & Development Corp. East Texas will operate as a wholly-owned subsidiary and will continue to produce bleached sulfate market pulp and paperboard. (Prior to the negotiations, the pulp and paper firm was owned jointly by Time and Houston Oil.)

---

**National Container Corp.'s**
new kraft corrugated container plant has been completed in Atlanta. The one-unit operation occupies about 110,000 sq. ft. and replaces the sheet plant previously operated in the Georgia city.

---

**MacMillan Bloedel Ltd.**
has ordered 12 mechanical drive turbines for its pulp division plant in Port Alberni, B. C. The units (which will drive paper machines, a sectional generator, a barker pump and auxiliary equipment) are being built by General Electric Co.'s Small Turbine and


Year after year, Lindsay takes a broader responsibility for its manufacturing operations. Step by step, we bring under our own direct, rigid control those significant processes which determine the uniform quality of our Fourdrinier wire cloth. The Lindsay Wire Weaving Company, Cleveland 10, Ohio.

LINDSAY WIRES Since 1904
FOR PAPER MANUFACTURING

## News of the Industry . . .

Supercharger Department in Fitchburg, Mass.

---

**Fraser Paper Ltd.**
of Madawaska, Maine, will install a complete J. O. Ross Engineering Corp. ventilation system on its No. 2 machine. It will incorporate Ross-Hooper hood, stainless steel economizers, room heating systems, bottom felt and aisle ventilation.

---

**Antler Wood Products Ltd.**
of Edmonton, Alta., is expected to incorporate as a public company for the purpose of establishing a kraft pulp mill and wood products plant in northern Alberta. The project is expected to cost $20,000,000.

---

**St. Joe Paper Co.**
of Port St. Joe, Fla., has purchased the entire stock of Reynolds Bros. Lumber Co. of Albany, Ga. The transaction gives St. Joe complete control of the Reynolds mill and 26,000 acres of timber in southwest Georgia.

---

**Arkansas Container Corp.**
will build a plant for the manufacture of corrugated shipping boxes in Fort Smith, Ark.

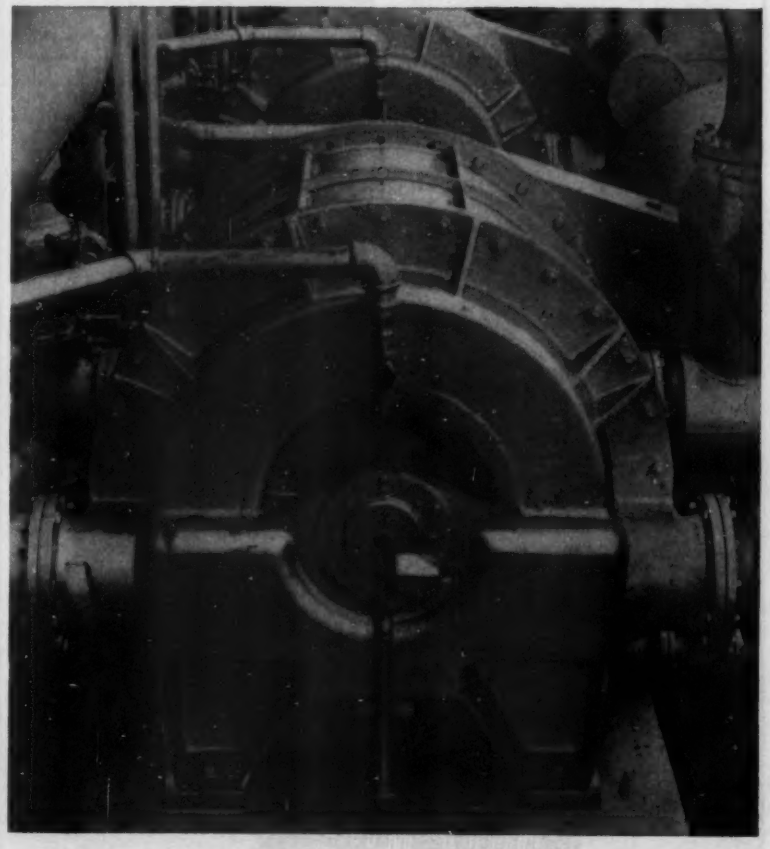
---

**National Gypsum Co.**
has started construction work on the expansion and modernization of its Alexandria, Ind. plant. Expected to cost several hundred thousand dollars, the project will double the plant's production of rock wool acoustical tile. Included will be the installation of new processing and drying equipment and the redesigning of some existing equipment.

---

**Lyons Falls Paper Corp.**
of Lyons Falls, N. Y., has become the full owner of Gould Paper Co., also of Lyons Falls, by buying the half interest held by International Basic Economy Corp., a financial development group founded by the Rockefellers. (International Basic Economy joined with Lyons Falls Paper and a Brazilian group in buying Gould Paper from Continental Can Co. in 1951.)


# High machine speeds? High temperature headbox stock? You need NASH Vacuum Pumps!



Air from the suction rolls on paper machines carries with it substantial quantities of moisture. This considerably reduces the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump, because of the unique principle of operation, the bulk of this vapor is effectively condensed inside the pump. The total capacity of a Nash is therefore increased.

When you specify a Nash Pump it can be closely sized to the job. It is not necessary to select an over-sized unit, because the rated capacity of the Nash may be relied upon.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

**NASH ENGINEERING COMPANY**

**441 WILSON ROAD, SO. NORWALK, CONN.**

# Who Makes Them?

**Where can you find—quickly—information on where to buy . . . . .**

. . . acid resisting linings?

. . . roll grinding machines?

. . . centrifugal pumps?

. . . paper stock washers?

. . . pitch controls and removers?

. . . synthetic resins?

. . . sulphur recovery systems?

**You'll find the answers to these questions and to more than 4600 others in the Buyers' Service Section of your**

**Paper and Pulp Mill Catalogue and The PAPER INDUSTRY are published by**

FRITZ PUBLICATIONS, Inc. 431 SOUTH DEARBORN STREET CHICAGO 5, ILLINOIS


News of the Industry . . .

### *Bauer Builds in Canada*

Bauer Bros. Co. has purchased a six-acre site in Brantford, Ont., where it is constructing a plant for the production and servicing of pulp cleaners. It will also serve as a distribution point for renewal parts of all Bauer products.

At a future date, further manufacturing activities will be established for equipment in use by the pulp industry in Canada.

### *Dilts to Manufacture Warren Air Brush*

The S. D. Warren air brush—for many years widely used in the aqueous coating industry—will now be manufactured and sold as a product of the Dilts Div. of Black-Clawson Co. at Fulton, N. Y. According to arrangements recently completed with S. D. Warren Co. of Boston, the product will be known as the Warren-Dilts air brush.

The brush is used in conjunction with coating machines on aqueous coatings where coating weight control and smoothness are essential. It will be furnished by Dilts as a component part of the standard roll-coating machines or as an auxiliary for existing equipment in widths of from 15 to 120 in.

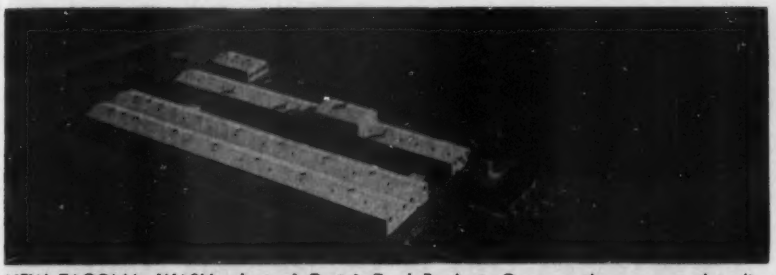
---

### *Allied News Briefs . . .*

**Clinton Foods Inc.** has started construction of a two-story research laboratory at Clinton, Iowa. The 100- by 120-ft. structure will cost an estimated $750,000. The lab will make possible enlarged research facilities in the fields of starch, corn sugars and corn syrups, animal feeds, vegetable oils and lactic acids.

**West End Chemical Co.** and **Stauffer Chemical Co.** have reported that representatives of their boards of directors are giving active consideration to a proposal for a merger of the firms. Under the proposed terms, West End will continue to operate under its present management as an autonomous division of Stauffer.

**Allied Chemical & Dye Corp.'s** Semet-Solvay Petrochemical Div. will use the services and facilities of Thompson-Hayward Chemical Co. in Kansas City, Mo., to make possible improved warehousing and



NEW TACOMA, WASH. plant of Certain-Teed Products Corp. produces a complete line of asphalt roll roofing and shingles. The plant was complete late last year.

technical service for Semet's A-C polyethylene accounts throughout the Midwest and south central part of the country.

Cooper Alloy Corp. has announced a stock-service agreement with Reading, Pratt & Cady of Atlanta. RP&C will maintain large stocks of Cooper stainless steel valves and fittings an its warehouses and will be charged with the responsibility for building sales through distributor outlets in the Southeast.

## Coming Events

### Tappi

May 7-9—Coating Conference, Benjamin Franklin Hotel, Philadelphia

May 17—Kalamazoo Valley (joint meeting with Mich. Supts), Hotel Harris, Kalamazoo

May 17—Pacific (joint meeting with Pacific Coast Supts), Gearhart Hotel, Gearhart, Ore.

May 18-19—Southeastern, King & Prince Hotel, Brunswick, Ga.

### American Pulp & Paper Mill Superintendents Association

May 17—Michigan (joint meeting with Kalamazoo Valley Tappi), Hotel Harris, Kalamazoo

May 17—Northwestern, Rhinelander, Wis.

May 17-19—Pacific Coast (joint meeting with Pacific Tappi), Gearhart Hotel, Gearhart, Ore.

May 18—Connecticut Valley, Roger Smith Hotel, Holyoke, Mass.

June 12-14—National Meeting, Lake Placid Club, Lake Placid, N. Y.

### Other Meetings

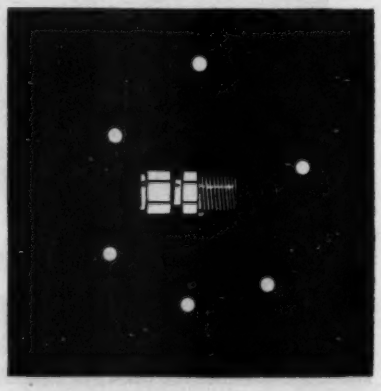
May 7-8—Forest Products Research Society, Pacific Northwest Section, Eugene, Ore.

June 4-7—Forest Products Research Society, 10th National Meeting, Asheville, N. C.

June 5-7—Paper & Twine Association, 1956 Annual Meeting, Nippersink Manor, Genoa City, Wis.

ALICEVILLE, Ala., recently welcomed F. C. Huyck & Sons, Rensselaer, N. Y. manufacturer of papermakers felts and industrial fabrics. Huyck is completing in Aliceville what will be the South's largest felt mill. Seen during the welcoming celebration are (l to r) C. W. LaDow, mill manager; Carl Elliott, Alabama Congressman; G. L. Brown, Huyck director of purchases; C. V. Spencer, Huyck vice president for operations; Miss Joanna Sharp, Alabama's Maid of Cotton; Sen. John Sparkman (Dem., Ala.); R. T. Clarke, secretary-treasurer, and E. D. Rhodes, vice president, both of Huyck


NOW Swagelok®
TUBE FITTINGS FROM
ALUMINUM
TO
Brass | Monel | Steel
Carpenter 20 | Nickel | Tantalum
Gold | Platinum | Teflon
Hastelloy | Silver | Titanium
Inconel | Stainless Steel | Zirconium
ZYTEL*
POLYAMIDE RESIN



From aluminum to "Zytel" there's a Swagelok answer to your fitting problems. The new Swagelok Tube Fittings of "Zytel" are for use with plastic tubing in applications where corrosion is a problem. They are the first to be made in a complete range of shapes that include elbows, tees, reducers and adapters.

The new Swagelok Tube Fittings of "Zytel" are made to the unique Swagelok patented design that provides strong, torque-free and leakproof joints at all tubing connections. Sleeves or inserts are unnecessary. Specify Swagelok for every fitting need and eliminate unnecessary fitting problems.

FREE: For complete information write for the Swagelok catalog. Address Dept. P4.

Swagelok Tube Fittings Are
Easy to Use
No Special Tools Needed
No Flaring or Threading

*DuPont trade-mark

CRAWFORD FITTING CO.
884 E 140th Street
Cleveland 10, Ohio

Announcing the NEW **HANCHETT**

MODEL **SK-24**

**SLITTER KNIFE GRINDER**
**for**
**Top or Bottom SLITTERS**
**WET GRIND**

- *finest finishes*
- *extreme accuracy*
- *rigid construction*
- *capacity 3" to 24" diameter*
- *semi or fully automatic*
- *positive and accurate fixturing*

**HANCHETT MANUFACTURING COMPANY**
*World's Largest Manufacturer of Knife Grinding and Saw Sharpening Machinery*
MAIN OFFICE — Big Rapids, Michigan WEST COAST — Portland 1, Oregon

performance is in the
**"prop"**

NEW *Aerovent* "Semi-Pressure" FANS

7-Blade "Machete" Airfoil Propeller

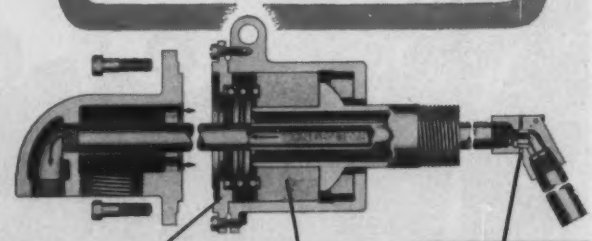
Now get top efficiency against resistances to 4½" SP *without* special equipment! Standard Aerovent units with new 7-blade propellers move more air at *slower* motor speeds with *less* horsepower. Write for folder.

Ask for bulletin S-50!

All Aerovent Fans are rated in accordance with the Standard Test Code and U.S.D.C. Comm. Std. CS178-51.

*Aerovent Fan Company, Inc.*
Ash and Blane Streets Piqua, Ohio

**Johnson Joint**
**SELF-SUPPORTED TYPE**
**with SYPHON ELBOW**



ASSEMBLY PLATE — Holds internal parts in position when head is removed.

SELF-SUPPORTING — Needs no external supports of any kind.

SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

***WRITE FOR INFORMATION***

Bulletin S-2001 has all the facts on this joint-and-elbow combination that supports itself, has no packing, needs no lubrication, outmodes unwieldy syphon pipes. Johnson Joints are also available in pipe-supported and rod-supported types, to suit all operating needs.

*The* Johnson Corporation
845 Wood St., Three Rivers, Mich.

# NAMES *in the* NEWS

C. D. Heubeck Jr.

W. G. Hartford

## *Champion-International Names New Vice President and Production Manager*

Champion-International Co., Lawrence, Mass., announced the election of two new members to the board of directors and the appointment of a new vice president and a production manager at its annual meeting.

William D. Ireland and Donald J. Hurley will serve on the board. C. Daniel Heubeck Jr., who has been with Champion since 1951 was named vice president in charge of industrial relations. W. G. Hartford was advanced to the position of production manager.

A. B. Moore Jr.

Jack Meadows

## *Crossett Announces Appointments*

Two major promotions in Crossett (Ark.) Co.'s Paper Div. executive personnel group have been announced.

A. B. Moore Jr. was promoted from assistant to the vice president and general manager to production manager of Paper Mill No. 2. Jack E. Meadows was moved up from assistant production manager of Paper Mill No. 1 to the newly created post of assistant Paper Div. manager.

## *U. of Maine Presents Award to G. E. Dyke*

The 1956 Honor Award of the University of Maine Pulp & Paper Foundation has been presented to George E. Dyke, president of Robert Gair Co. Inc. "in recognition of his years of service to the paper industry." The presentation was made at the annual luncheon of the university's alumni in the pulp and paper industry.

George E. Dyke

W. J. Dixon

## *St. Regis VP Retires*

Willard J. Dixon, vice president and director of St. Regis Paper Co., has resigned from active service, in line with the company's retirement plan. He had resigned from his position as secretary last November.

Mr. Dixon has served the paper industry in many activities of its associations. He will continue to serve St. Regis as a director and will be available as a consultant.

## *American Forest Products Elects Officers*

W.J. Bailey, vice president of West Virginia Pulp & Paper Co., has been elected president of American Forest Products Industries Inc., national tree farm sponsor. G.W.E. Nicholson, Union Bag & Paper Corp., and William Swindells, Williamette Valley Lumber Co., were named vice presidents. Paul Koenig, P.H. Glatfelter Co., was elected treasurer.

Trustees are J.R. Kimberly, Kimberly-Clark Corp.; R.E. Wortham Jr., Southland Paper Mills Inc.; D. S. Denman, Crown Zellerbach Corp.; Mr. Nicholson; Sydney Ferguson, the Mead Corp.; William Hilton, Great Northern Paper Co.; Clyde B. Morgan, Rayonier Inc.; E.B. Birmingham, Hammond Lumber Co., and Leonard G. Carpenter.

Charles A. Gillett was reappointed managing director of the program, which gives public recognition to private landowners who grow timber as a crop.

## *CBBM Appointments*

Henry J. Abernathy has been named general manager of the Walloomsac Div. of Columbia Box Board Mills Inc. at Chatham, N. Y. He succeeds Leon Settles, who remains in an administrative capacity.

Mr. Abernathy comes to Columbia from National Folding Box Co. of New Haven, Conn., where he was mill manager. He had previously been superintendent for Continental Paper Co. at Ridgefield Park, N. J.

In another Walloomsac appointment, Gerard Chapman has been named a chemist at Chatham. A graduate of Massachusetts Institute of Technology, he was previously a development engineer in the Technical Div. of Wood Conversion Co. in Cloquet, Minn.

---

**Joseph M. Murphy** has been named special production representative for the Container Div. of Robert Gair Co. Inc. He had been superintendent of the Connecticut Corrugated Box Div. since 1947.

Joseph Murphy

H. John Burns

**H. John Burns** has been appointed administrative assistant to Powell River Co. Ltd.'s president, M. J. Foley. Mr. Burns joined Powell

River five years ago as comptroller. He was at one time associated with Sorg Paper Co.

**R. C. Adamson** has been promoted to the position of plant manager of Wabash Fibre Co.'s Terre Haute (Ind.) Div. He was general superintendent at the time of his appointment.

R. C. Adamson

D. A. I. Goring

**Dr. David A. I. Goring,** recently of NRC's Maritime Regional Laboratory, Halifax, has been appointed to the staff of the Pulp & Paper Research Institute of Canada. Joining the Physical Chemistry Div., Dr. Goring will initiate a program of investigation into the basic physical chemistry of lignin and its derivatives.

**Alexander Calder Jr.,** formerly executive vice president and general manager of Union Bag & Paper Corp., New York, has been made president of the company, succeeding Alexander Calder, who will remain as chairman of the board. Mr. Calder Jr. joined Union Bag in 1940.

A. Calder Jr.

Art Bernhardt

**Art Bernhardt** has been named superintendent of the Nekoosa-Edwards Paper Co.'s kraft mill at Port Edwards, Wis.

**Harrison J. Daysh** has been appointed to the position of industrial relations secretary of the American Paper & Pulp Association.

**Dr. Reavis C. Sproull,** director of Herty Foundation Laboratory, has resigned to accept a position as manager of technical services for Philip

## Names in the News . . .

Morris with headquarters in Richmond, Va. He will be succeeded by his former assistant, **William L. Belvin.**

**Joseph S. Glasing,** former superintendent of Westfield River Paper Co.'s Russell, Mass. mill has been promoted to assistant to the vice president in charge of manufacturing. He has been with Westfield since 1916.

**F. X. Guimond** has been named manager of pulp manufacturing at Brown Co., Berlin, N. H. He was formerly with Canadian International Paper Co. as supervisor of production of various high grade dissolving pulps for textiles and films.

**James B. Foster** and **John B. Shearer** have been named plant engineer and industrial engineer at the Mobile, Ala. paperboard div. of Stone Container Corp.

**Dr. Cecil L. Hess** has been promoted to assistant to the general superintendent of the pulp and paper div. of Minnesota & Ontario Paper Co.'s specialty mill at International Falls, Minn. Dr. Hess has been in Mando's research lab since joining the firm in 1951.

**A. L. Sherwood,** vice president in charge of engineering for the Sutherland Paper Co., Kalamazoo, Mich., and **L. D. Nicholson,** president of the Michigan Paper Co., Plainwell, have been elected to membership in the advisory committee for paper technology at Western Michigan College.

**Charles W. Bodnar** has been appointed eastern district manager for the St. Regis multiwall bag plants at Pensacola, Florida; Franklin, Va.; Nazareth, Pa.; Toledo, Ohio; and Ponce, Puerto Rico. He joined St. Regis in 1944 and has been branch manager of the Pensacola bag plant since 1947.

**Dr. Otto Maass,** retired general director of the Pulp and Paper Research Institute of Canada and chairman of the Department of Chemistry at McGill University until last year, has been awarded the CPPA Special Service Award Medal in recognition of his outstanding service to the pulp and paper industry and to Canada in the field of scientific research and education.

**Kurt C. Neuenfeldt,** former product development engineer, has been appointed chief engineer at Hammermill Paper Co., Erie, Pa.

**L. J. Forrest** has been named assistant manager of the Northwestern Timber Div. of Rayonier Inc. All of the more than 400,000 acres of forest land in Washington State owned or operated by the company are now under a continuous program of sustained yield management under his direction.

**William S. Griems,** former assistant manager of the Ahdawagam Div. of Consolidated Water Power & Paper Co., has accepted the post of technical director with Orchard Paper Co.

**F. Harold Davis** has retired as chief of the newsprint department of research and development of Kimberly-Clark Corp. after serving the paper industry for 35 years.

**Ronald A. Westgate** has been appointed manager of Marathon Corp.'s projected Newnan, Ga. carton converting plant and will assume his new duties as soon as a successor to his post as finishing room superintendent is found.

**Arthur C. Price,** president of Price Bros. & Co. Ltd., has been named new chairman of the executive board of the Canadian Pulp & Paper Association.

**L. W. Murtfeldt** has been appointed assistant mill manager of the Wisconsin Rapids Div. of Consolidated Water Power & Paper Co.

**Dr. Harry F. Lewis,** vice president of the Institute of Paper Chemistry, Appleton, Wis., has been elected 1956 chairman of the American Chemical Society's division of chemical education.

**Albert H. Edwards** of Jacksonville, Fla., mechanical engineer and formerly vice president and a director of National Container Corp., has retired after 24 years of service with the company.

**James Schoettler,** formerly a research chemist at Kimberly-Clark Corp., Neenah, Wis., has joined Consolidated Water Power & Paper

Co. as technical supervisor of the Wisconsin Rapids Div.

**Frank B. Willson,** manager of International Paper Co.'s Woodlands Div. for over 46 years, has retired. He will be succeeded by **Gerard A. Pesez,** his assistant for the last 15 years. Willson supervised the growing and cutting of trees for the company in New York, Vermont and New Hampshire.

**Maurice Larson** succeeds **Richard Elias** as mill superintendent at Bergstrom Paper Co., Neenah, Wis. The latter has accepted a position at Marathon Corp. **Richard Peterson** will take Larson's former post as assistant mill superintendent, and **George Sisler,** formerly of Abitibi Power & Paper Co. Ltd., replaces Peterson as technical director.

## *Allied Personalities*

**Richard W. Polleys** has been named technical advisor on the engineering staff of John W. Bolton & Sons Inc. of Lawrence, Mass. Mr. Polleys was recently associated with Downingtown Mfg. Co. of Downingtown, Pa., and was formerly with the Shartle Bros. Div. of Black-Clawson Co., Bryan Paper Co. and Mead Corp.

**B. L. Owens,** formerly general sales manager, has been named director of sales for the Atkins Saw Div. of Borg-Warner Corp. In another Atkins appointment, **James E. Butler** has been named sales manager for both Atkins divisions, industrial and hardware. He was formerly field sales manager for the Industrial Div.

Carthage Machine Co. has appointed **John B. Chandler** of Atlantic Beach, Fla., as its southern representative.

**N. D. Cunningham** has been named technical service representative for Lockport Felt Co. Formerly with Philip Carey Co., he will specialize in engineering and technical service to paper manufacturers.

**C. Richard Sword** has been appointed manager of sales of Aerovent Fan Co. Inc. He has been assistant manager of sales since 1952.

**Sam Emison** has been named director of industrial chemical sales for Stauffer Chemical Co. He joined Consolidated Chemical Industries Inc. (recently merged into Stauffer) in 1925.

Changes in territorial assignments have been reported by the sales department of Tube Turns, Louisville division of National Cylinder Gas Co.: **Earl R. Muir Jr.,** formerly district manager at Seattle, has been transferred to Louisville, where he becomes manager of the newly formed Central District; **Richard T. Burke,** formerly at the Houston office, succeeds Muir at Seattle; **Vernon Shallcross,** a member of the Tulsa staff, has become a representative in the Denver territory, and **W. C. Robinson,** formerly assistant sales manager of the Eastern Div., has been assigned to special promotional programs at the Pittsburgh office.

**George B. Leighninger** has been made manager of the Los Angeles branch of Stein, Hall & Co. Inc. Since 1954, he has been assistant manager of the Chicago branch.

Albany Felt Co. has assigned

Hornet Chippers are always custom made of individually selected steels . . . scientifically heat treated . . . precision ground. Made by New England craftsmen of long experience, who have the know-how to produce knives that speed production, lessen waste and hold down-time for regrinding to a minimum. One trial will convince you.

**B & B DIVISION**
**LODDING ENGINEERING CORP.**
**UNION • NEW HAMPSHIRE**

**Charles W. Page** to a new sales territory including the states of Washington and Oregon and **Robert D. Gregory Jr.** to an area covering parts of Indiana, Ohio and western New York. Page has represented Albany as a sales engineer since 1948.

Hercules Powder Co. (Canada) Ltd. has appointed **Daniel D. Cameron** as sales manager of its Paper Makers Chemical Department. For the past three years he has been district manager at Kalamazoo, Mich.

Black-Clawson (Canada) Ltd. has announced the election of **J. D. Haskell** as president of the recently formed Canadian manufacturing subsidiary. He is also a vice president of the parent Black-Clawson Co. and a director of Black-Clawson International Ltd. Mr. Haskell joined Dilts Machine Works Inc. in 1921.

Dilts Div. of Black-Clawson Co.: **Balfour Clark,** former estimating engineer at the B-C Paper Machine Div. in Watertown, N. Y., has been named a Dilts sales engineer; **Bernard Majani,** presently in sales training, becomes a sales representative, and **James J. Melead,** formerly a project engineer for converting machinery installations, has been promoted to assistant chief engineer of Dilts.

## Necrology . . .

**George W. Hormuth,** president and treasurer of Molitor Box Co., died of a heart attack at the age of 60. He had headed the Milwaukee company since the death of his aunt, Miss Mary Molitor, shortly after his graduation from Marquette University in 1917.

**Roger J. Rock,** retired president of Mutual Box Board Co., Utica, N.Y., died after a long illness. He was 81.

**Floyd R. Graham,** 67, founder and former president of Graham Mfg. Co., paper processors at Holyoke, Mass., died after a short illness. His son, Lawrence A. Graham, succeeded him as president after his retirement in 1953.

**Dr. James M. Swaine,** former Dominion entomologist, died in Ottawa at 77. He was a leader in the fight against forest insects.

**Earl Eaton Shaw,** senior forestry adviser to the woodlands div. of Canadian International Paper Co. died in February in Montreal. He was 64.

**David Smith Troy,** 51, plant manager of Weyerhaueser Timber Co. operations at Klamath Falls, Ore., died recently after a heart attack.

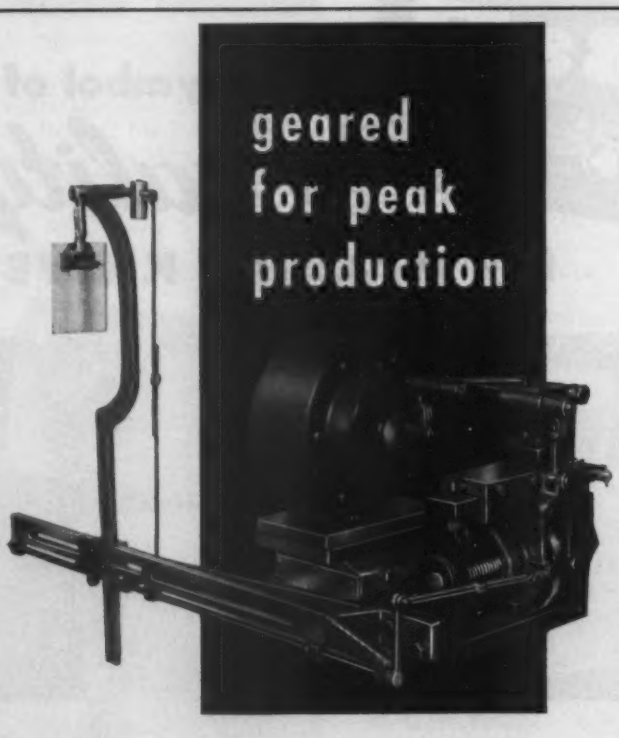
**William F. Jackson,** 80, retired superintendent of the Badger-Globe mill of Kimberly-Clark Corp. and production manager of mills of International Paper Mills, died recently in Florida.

**Ralph Jacobs,** owner of Jacobs & MacKnight, paper box company in New York, died recently after a short illness. He was 66 years old.

**George Seifert,** retired president of the Angeles Paper Box Div. of Robert Gair Co. Inc., Los Angeles, died in February at the age of 60.

**Herbert W. Harker,** director of service operations for Kimberly-Clark Corp., Neenah, Wis., died at the age of 39 after several months of illness.

**Clement J. Kusnierek,** 52, chief construction engineer of Minnesota & Ontario Paper Co.'s engineering div., died in an auto accident near Willmar, Minn. He had been with Mando since 1929.


**This Gilbert and Nash Model 434** guide is geared for today's high-speed production requirements. A sealed planetary reduction gear and anti-friction bearings *assure* trouble-free operation at machine speeds *up to 3000 f.p.m.!*

This low-contour guide is recommended for wire, wet felt and dryer felt service.

And like all Gilbert and Nash guides . . . Model 434 is *engineered for the job!*

GILBERT and NASH company

*Manufactured and sold exclusively by The Appleton Machine Company

**Fourdrinier construction**

(Continued from page 31)

nance of uniform draws on the paper machine had become a limiting factor which was further accentuated by the incorporation of breaker stacks, size presses, and coaters in the high mass dryer section.

***Paper machine drive (Rice Barton Corp.)***

▶ Each sectional drive in the new design is divided into two gear units —a hypoid gear unit set into the lineshaft, providing the right angle drive, and the differential gear unit. The clutch, on a high speed shaft between the two units, makes it posible to shut down the differential unit without stopping the lineshaft. Controls, with draw indicator, are located on the front side of the machine.

***Rewinder (Beloit Iron Works)***

▶ The modern rewinder operates at speeds above 5500 fpm. The development of the "Tru-tension" type antomatic tension control and improved unwind stand brakes has made it possible to compensate continuously and accurately for any speed and mass of the roll in the unwind stand—opening the path to maximum acceleration and deceleration rates without affecting sheet tension.

▶ Time saving devices are now available, or being developed, to reduce the time for the various operations required to bring a full reel of paper from the calender to the roll wrapping stage.

***Winder (Rice Barton Corp.)***

▶ The modern winder incorporates (1) hydraulic loading or relieving the rider roll from main control station, (2) pneumatic roll push-out mechanism, (3) metal chute with air assist to lead the sheet up between the rolls, (4) clamping device to hold the sheet between the drums while removing the finished roll, (5) spreader roll, adjustable while running, (6) mechanism simplifying slitter adiustment, and (7) brakes on paper rolls in the slitter section to minimize coasting periods.

***Controls (Beloit Iron Works)***

▶ New machines can now be equipped with wire tension indicators, felt tension indicators, wet and dry end beta-ray gauges, flat box yacuum controllers, dryer section moisture controllers, sequential machine startup arrangements, etc. It is logical to expect that the trend toward instrumentation will continue.

# SAFETY NEWS

## *Perfect Scores Reported by Four in Southern Safety Association*

THE AVERAGE FREQUENCY rate of injuries for 63 member mills competing in the 1955 contest of the Southern Pulp & Paper Safety Association was 7.43. This is slightly higher than 1954's 7.32, but compares favorably with the 8.52 recorded in 1953. The rate is based on injuries per million man-hours worked.

Three pulp and paper mills turned in perfect scores: Buckeye Cellulose Corp., Memphis, Tenn., with 1,347,-072 man-hours of exposure; National Container Corp. of Virginia, Big Island, Va., with 442,006 man-hours, and Hammond Bag & Paper Co., Wellsburg, W. Va., with 75,123 man-hours.

Only one other perfect score was reported last year. The Mead Corp. at Lunchburg, Va., competing in the woods operations division, had no injuries in 6320 man-hours of exposure.

Among 11 bag plants competing in the converting industries division, Gaylord Container Corp., Bogalusa, La., recorded the best score: 2.58 with 773,434 man-hours of exposure. The average rate for bag plants in 1955 was 4.22, an improvement over the previous year's 4.53 and 1953's rate of 12.12.

The six box plants in the converting industries division had an average rate of 8.77 last year. Previous averages were 11.20 in 1954 and 14.25 in 1953. International Paper Co. led the group, recording 4.41 for 452,986 man-hours of exposure.

The greatest improvement in average frequency rate was recorded for the woods operations division—13.90 as compared with 19.61 and 22.95 for 1954 and 1953 respectively. Of 12 competing firms, Mead with its perfect score and two other companies did most to reduce the average. St. Regis Paper Co., Southern Woodlands, Pensacola, Fla., recorded 4.52 for 220,601 man hours and North Carolina Pulp Co., Plymouth, N.C. had a rate of 5.09 for 392,328 man-hours.

**For unusual opportunities, see the classified ads on page 85.**

### *Fraser Mill Marks 3rd Accident-Free Year*

The Newcastle, N. B. kraft pulp mill of Fraser Companies Ltd. recently marked its third year without a lost-time accident. The last such mishap occurred in the mill December 8, 1952.

The safety record of the plant, which was built in 1949, has won for it several national and international awards. At the present time it is leading its section in the 1955 Safest Mill in Canada Contest sponsored annually by the *Pulp and Paper Magazine of Canada*. It is also grouped with five other mills in first place in its class in the competition sponsored by the National Safety Council.

In October the Newcastle mill won the coveted Edward Benton Fritz Memorial Trophy at the National Safety Congress in Chicago. The award, which was given for 1954 performance, is sponsored annually by THE PAPER INDUSTRY.

In his message of congratulation, Aubrey Crabtree, president of the firm, said that the safety record of the Newcastle mill is almost without parallel in the Canadian pulp and paper industry. He commended the efforts of all personnel and particularly those of the mill's safety committee under the chairmanship of D. A. Adams, electrical superintendent.

R. B. Murchie, mill superintendent, declared that the record had been attained without recourse to prizes, contests, or other awards or gimmicks. Mr. Adams' safety committee, he said, takes its responsibility seriously and works constantly to promote safety. In turn, sound recommendations from the committee are acted upon promptly by the company.

# FOREIGN ABSTRACTS

## Odor permeability of cellulose films

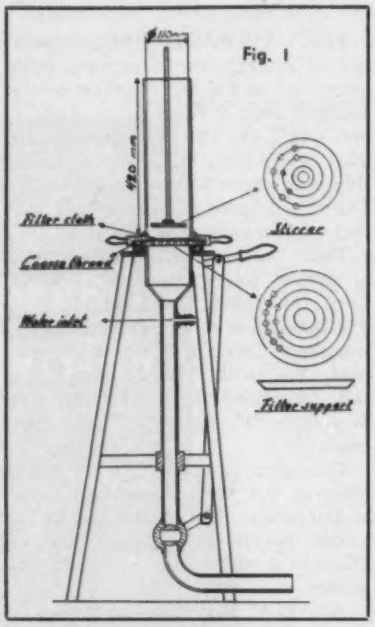
Films prepared by the viscose or the cuprammonium processes ordinarily contain about 75 per cent cellulose, 10 per cent water and 15 per cent of some plasticizer (like glycerol or the glycols). Such films exhibit a low permeability for various aromatic vapors, and are therefore very well suited for the packaging of spices and similar odorous substances. This low permeability was studied, and in general it depended on the thickness and the area of the film, the type of plasticizer, the behavior of any lacquers used in the packages, the temperature and the time that the packages are kept, and the behavior of the aromatic packaged material with regard to solubility in water, plasticizer or lacquer.

The insolubility of most of the aromas in water accounts for the "aroma-proofness" of the film. Plasticizers with little solvent action on the aromas should be used. The films may require lacquering to insure water vapor permeability and heat-sealing properties, but this may affect impermeability to odorous vapors adversely, depending on the components of the lacquer. Some lacquers also become tacky. These dangers may be minimized by using two films, an inner non-lacquered one and an outer lacquered one. K. S. Kunze. *Verpackungs Rundschau* No. 9, 471, 474-5 (1955) (original in German); through *Bull Inst. Paper Chem.* 26, No. 5, 383-4 (1956).

## Heterogenous hydrolysis of cotton and sulfite pulp

After a review of previous work on cellulose hydrolysis, and a description of the author's materials and techniques, the following general conclusions are reached. As a result of the measurements, the limiting values in degree of polymerization of cellulose, when subjected to heterogeous acid hydrolysis, depend largely on the supermolecular structure of the material studied expressed as the ratio of crystalline to amorphous material. Degradation curves, moisture sorption, and x-ray measurements indicate that cellulose regenerated from cupriethylenediamine solutions, and then dried from benzene, contain amorphous regions that do not lend themselves to the sorption of moisture. This phenomenon is discussed at some length.

The hydrolytic procedure results in a "real" crystallization both of the original cellulose and the regenerated cellulose (irrespective of whether cotton or pulp is hydrolyzed). In the native cellulose, this real crystallization amounts to about .2 per cent. In the case of regenerated celluloses the crystallization may reach 15 per cent. Four tables, three graphs and 22 references are given. Jan Linderot. *Svensk Papperstidn.* 59, 37-43 (1956) (in English).




## Formation of laboratory brightness sheets

The method and equipment have been proposed by the Analysis Committee of the Swedish Central Laboratory of the Cellulose Industry. The apparatus includes a disintegrator (like a Turmix), a plastic sheet machine shown in Figure 1, fitted with cloth made from synthetic fibers (like Redivin, type RL 32, or some other material), a hydraulic disc press, a cylinder drier (temperature 55-60° C.), and various types of filter papers, blotters, and flexible discs (of plexiglass or celluloid). Full directions are given for forming, pressing, drying and measuring the brightness of the test sheets, which are formed from fully bleached pulps. C. C. A. 26:55 (Tentative) *Svensk Papperstidn.* 59, 12-13 (1956) (in English).

## Potentiometric determination of sulfides in black liquor

After reviewing the literature on the determination of sulfides in kraft black liquors, with special emphasis on potentiometric techniques, the authors describe a new procedure. In the storage of samples of black liquors, sulfides are oxidized quite rapidly, so, in the present study, samples were kept under liquid paraffin in open flasks, which proved to insure against changes in the sulfide content even after three months of storage.

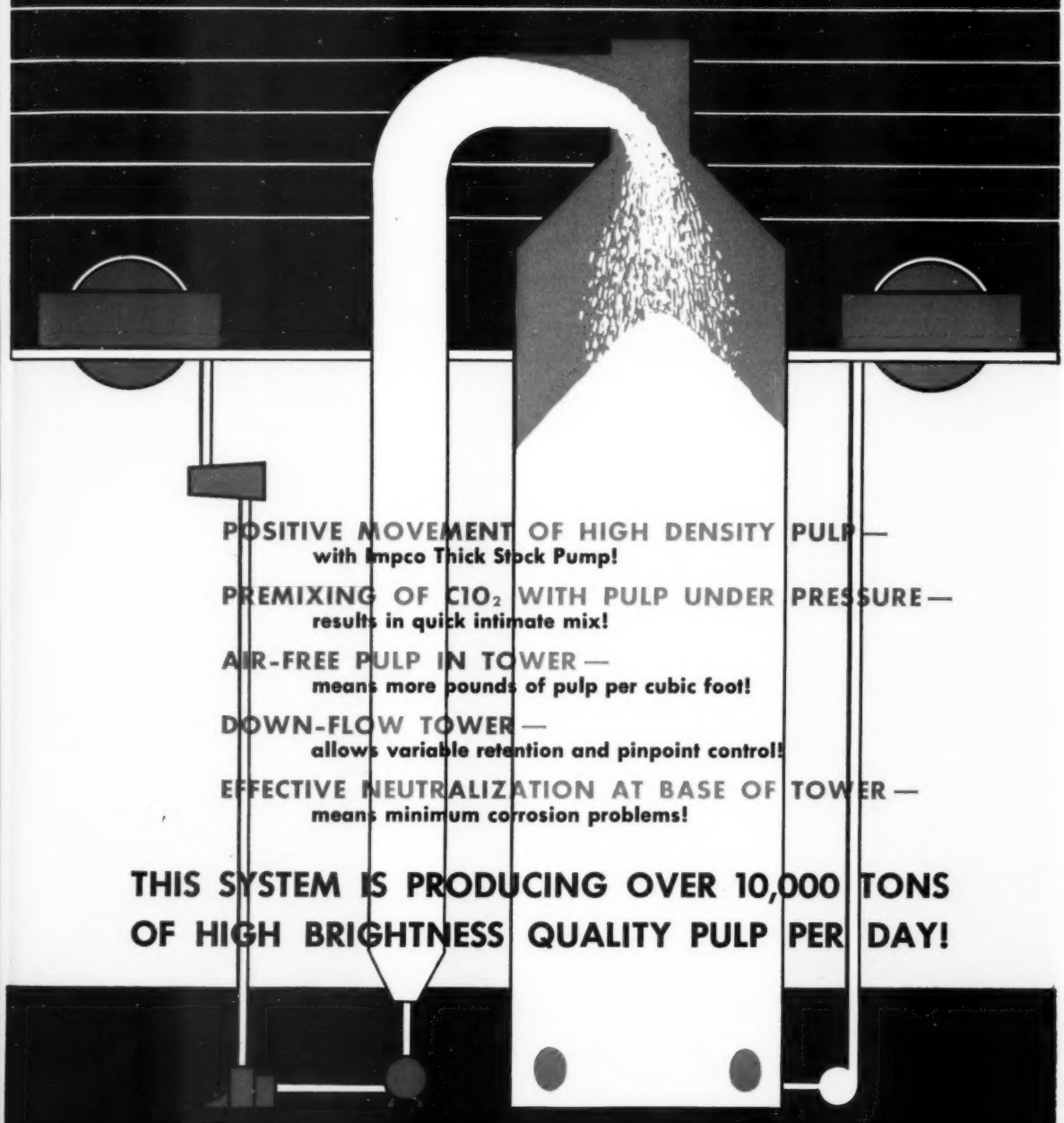
In the present method the reference electrode was a commercial calomel electrode (type Radiometer K-100). The indicating silver electrode involved a slight modification of that of Borlew and Pascoe [*Paper Trade J.* 122, TS 99 (1946)], and the innovations are fully described. In the present procedure, ammoniacal 0.1*N* cadmium sulfate was used as the titration agent, in place of the usual ammoniacal silver chloride solution. Five to 10 ml. of the black liquor to be tested was pipetted into 170-175 ml. of distilled water, 20 ml. of ammonium hydroxide were added, and the titration was carried out with the standardized cadmium solution. When pure sulfide solutions were used the cadmium method gave results checking closely with those obtained by the silver technique.

Various mill samples of black liquor were also analyzed by the two methods, and the cadmium method invariably gave results that were lower than those obtained by the silver titration. At the earlier stages of the cook, relatively small differences existed, but these increased as the cook proceeded, and towards the end of the digestion they were as high as 11 per cent. In contrast to the silver method, cadmium was not reduced by organic matter in the liquors, even over an extended time period, and this may be, in part, the cause for the lower results obtained with cadmium. When the black liquors were oxidized partially, the cadmium method could no longer be applied. The results are discussed. Six tables, two graphs and 12 references are given. Juha Alhojärvi and Berndt Anthoni. *Paper and Timber (Finland)* 37, 569-574 (1955) (in English).

## Physico-chemical properties of solutions of cellulose in cupreous solvents

The composition of cellulose in cupriethylene diamine and in cuprammonium hydroxide were studied using light absorption measurements and the structures of the resulting complexes were formulated. Molecular weight determinations were made by sedimentation and diffusion experiments in the two solvents, using a sulfite pulp containing 91.4 per cent alpha-cellulose, with a TAPPI viscosity of 20. By these methods, the degree of polymerization was found to be about 2200-2400, which was almost three times as high as the value obtained by the use of the Ost-

# Impco chlorine dioxide bleach system



**POSITIVE MOVEMENT OF HIGH DENSITY PULP —**
with Impco Thick Stock Pump!

**PREMIXING OF $ClO_2$ WITH PULP UNDER PRESSURE —**
results in quick intimate mix!

**AIR-FREE PULP IN TOWER —**
means more pounds of pulp per cubic foot!

**DOWN-FLOW TOWER —**
allows variable retention and pinpoint control!

**EFFECTIVE NEUTRALIZATION AT BASE OF TOWER —**
means minimum corrosion problems!

**THIS SYSTEM IS PRODUCING OVER 10,000 TONS OF HIGH BRIGHTNESS QUALITY PULP PER DAY!**

IMPCO®

**IMPROVED MACHINERY, INC.**
**NASHUA · NEW HAMPSHIRE**

Sherbrooke Machineries Limited, Sherbrooke, Quebec manufacture similar equipment in Canada

180

Mr. Bohlin, can you expedite those three pulpstones on our last order? We are changing grades and need them sooner than expected.
I believe that we can, Mr. Whitney. I saw those stones in the factory this morning and they were well along so I'm sure we can get them out next week.
SERVICE AT HEADQUARTERS
. . . . long-experienced order personnel* to handle and expedite your orders; skilled engineering personnel to solve your special problems, not only in connection with Norton Pulpstones but also the many other Norton products for the pulp and paper industry.
Yes, you can be assured of genuinely helpful service, both in the field and at headquarters.
*This is Ralph H. Bohlin, pulpstone service specialist in the Worcester sales office, a member of the Norton organization for 14 years. Call him anytime at Worcester, PLeasant 2-4641.
NORTON COMPANY, WORCESTER 6, MASS.
Norton Company of Canada, Ltd., Hamilton, Ont.
NORTON
PULPSTONES

## Foreign Abstracts . . .

wald viscometer. These discrepancies are discussed at some length.

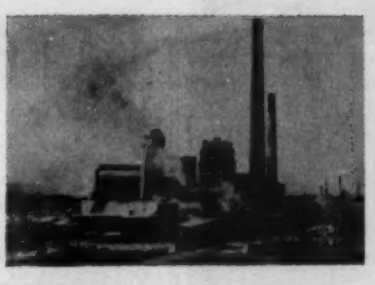
It was shown that the charge effects in sedimentation and diffusion are very slight, because the cellulose-copper complex is but slightly dissociated, and the electrolytes present in the ordinary cupriethylene diamine or cuprammonium solutions depress these effects to values of 0.2-0.3 per cent (which are negligible). Attempts to depress such effects by $NH_4SCN$ were not satisfactory since it caused an agglomeration of the cellulose. Six figures and 17 references are given. Nils Gralen and Jan Linderot. *Svensk Papperstin.* 59, 14-18 (1956).

### Molecular weight of white birch cellulose

Three separate specimens of white birch wood (*Betula papyrifera*) were subjected to direct nitration, which gave rise to an undegraded cellulose nitrate (containing 13.6-13.8 per cent nitration), the yields of which corresponded quite closely to the estimated alpha cellulose in the original sample. In the case of sapwood, the average degree of polymerization of the cellulose nitrate was about 5600. That obtained from the heartwood was about 5000, and the overall average for the birchwood cellulose was about 5500. However when an alpha cellulose was prepared from a holocellulose, its degree of polymerization was about 2480. A holocellulose prepared by the chlorination procedure from the birchwood had an average degree of polymerization of 4700, and the hemicellulose isolated from the holocellulose showed a degree of polymerization of about 170. Evidently the presence of lignin degradation products in the nitrating bath (applied to wood) minimized degrading effects of the nitration mixture.

The degrees of polymerization were determined viscometrically. When the nitrates were boiled with water or with methanol, considerable degradation occurred, especially in the case of water. Fractional precipitation with acetone-water or acetone-hexane caused depolymerization which could not be eliminated. The results of one two-stage and four one-stage fractionations indicated a symmetrical weight frequency distribution with only one maximum. Chain length distribution studies of the corresponding alpha and the holocelluloses also contained only one peak, which showed a left-handed "skewness".

In comparing the present study with that on other cellulosic materials. it appears that the degree of polymerization of native birch cellulose (i.e. that obtained by the direct nitration of the original wood) is very similar to that of ramie and milkweed floss, but is actually higher than that of cotton, flax, balsam fir or white spruce. Eighteen tables, six figures and 42 references are given. T. E. Timell. *Svensk Papperstidn.* 59, 1-11 (1956) (in English).



### Expansion of the Mantta Mills in Finland

To increase the production of their sulfite pulp mill, and to end water pollution caused by spent sulfite liquors, as well as to meet the growing demand for steam power, the future plans of the Mänttä Mills of G. A. Serlachius Oy include the building of a barking plant and chip bin building, the installation of a new clad-steel digester, a spent liquor evaporation plant, and the enlargement of their steam power plant. The mills are shown in the figure, with scaffoldings of the new barking plant under construction in November, 1955. Anon. *Finnish Paper and Timber* No. 10, November, 1955 (in English).

### Bleaching of birch sulfate pulp

A birch kraft pulp (with a Roe number of 4.5) was bleached in the laboratory by two different sequences, using a four stage bleaching operation. In series I, this sequence was chlorination, followed by alkaline extraction and then by two hypochlorite treatments. In Series II, the sequence began with a hypochlorite bleach (involving varying amounts of active chlorine) followed directly by chlorination, an alkline extraction and a final hypochlorite bleaching.

As seen from the table, Series II offered certain advantages over Series I, not only with regard to total active chlorine consumption, but also when it came to pulp viscosity. The best results in Series II were obtained when the active chlorine in the first hypochlorite stage was 2 per cent based on the weight of oven-dried pulp. Evidently the amount of active chlorine used in the first stage is of major importance.

This is the 10th paper in a series on birch as a pulping raw material. Four tables, one diagram and 10 references are included. All tabulated data are given in English although the paper is in Swedish (with a very brief English summary). Waldemar Jensen, Bo Lindholm and Paul Wärnä. *Paperi Ja Puu* (Finland) 38, 13-16 (1956).

### Quality evaluation of corrugated board

This subject is treated in two articles. The importance of introducing quality standards is discussed, together with the requirements of reliable testing methods. Manufacturers prefer the bursting test, whereas consumers lean towards the revolving drum test. Both methods are justified, but it is not possible to derive other properties of corrugated board from burst data, even though the railway certificates are based on the results of bursting strength.

The authors made a critical study of the bursting strength test with special reference to corrugated board. Data were obtained with the Schopper-Dalén tester and with the Mullen tester, and the results indicate that burst data obtained with the former may be influenced by the flat crush resistance of the corrugated middle layer and are often too low. Such difficulties are not encountered when the Mullen tester is used.

In the second paper the flat crush and puncture tests were studied. In place of the usual American flat-crush tester, the stress-strain recorder devised by Steenberg was modified so that the relationship between the crushing process and the load to final failure could be recorded graphically. The elastic behavior of the flutes under repeated stresses could also be followed.

The results indicated that for the general evaluation of board quality, the observation of the deformation and the resistance to flat crush as recorded by the American flat crush tester are sufficient. It was shown that the results obtained with the American puncture tester depended on the kinetic energy with which the puncturing point strikes the sample, and the measuring range defined thereby. Deviations from the actual force of puncture may be as high as 15 per cent. The author suggests that the measuring range be given in all tests. Important properties of corrugated board are initial and internal tear, and especially stiffness, and these appear to be satisfactorily indicated by the puncture test under the stresses found in actual practice. Thus the puncture test is a better criterion for the evaluation of board quality than is the bursting test.

The first paper includes four tables and nine figures; the second one includes three tables and nine figures. H. Kienzl and W. Vollmer. *Verpackungs Rundschau* No. 9, Suppl. 57-60 (1955). W. Vollmer. *Ibid.* No. 11; Suppl. 73-76 (1955); through *Bull. Inst. Paper Chemistry* 26, No. 5, 351-2 (1956). (The original is in German).

**Table I—Comparison of Series I and II, Calculated to a Brightness of 84% Hunter**

| | Series I | Series II | | | |
|---|---|---|---|---|---|
| | | 0.5* | 1.0* | 2.0* | 3.0* |
| Elementary chlorine added, % | 4.80 | 4.47 | 4.03 | 3.35 | 2.50 |
| Hypochlorite chlorine added, % | 2.75 | 2.66 | 2.75 | 3.10 | 4.16 |
| Total active chlorine added, % | 7.55 | 7.13 | 6.78 | 6.45 | 6.66 |
| Alakali added, % | 2.36 | 2.35 | 2.43 | 2.56 | 2.80 |
| Viscosity of pulp | 85 | 62 | 102 | 125 | 147 |

*Per cent chlorine added as hypochlorite in the first stage

# don't deal yourself Out....

**of the advantages of variable-area metering for large flows**

Here is a high capacity variable-area meter to handle from a hundred to thousands of gallons per minute with predictable calibration performance.

Adaptable to vertical or horizontal inlet fitting. No lengthy, straight piping runs necessary. Fits conventional flow lines without creating excessive pressure drops. Self purging.

*here's what you win with this meter*

- Economy—Requires no special piping
- Flexibility—For limited space installation
- Rangeability—At least 10 to 1; with simple linear calibration

Deal yourself in on the many benefits of this F&P High Capacity Flowrater Meter. Write for Catalogue 10-A-43 and complete information today.

LA1000

**FISCHER & PORTER CO.**

**2346 County Line Road, Hatboro, Penna.**


# PATENT REVIEWS


MELVIN NORD*


## Tubular hydroextractor

U.S. 2,709,397, issued May 31, 1955, to Helmuth Banning and assigned to O. Dorries A. G. vorn. Maschinenfabrik Banning & Seybold, describes a tubular hydroextractor for purifying suspensions of fibers.

As shown in Fig. 1, the hydroextractor consists of an extractor tube 1 with a head 11 at the upper end containing a tangential inlet 12 for the incoming suspension and an axial outlet 13 for the purified suspension. A circular slit 2 is provided at the lower end of the extractor tube, this slit being surrounded by an annular channel 3. A water inlet pipe 4 opens tangentially into the annular channel. At the bottom of the extractor tube a funnel 5 is mounted, by which the impurities (which are of greater density than the fibers) drop through a check valve 6 into a sump 7.

In operation, the suspension moves downward in an outer vortex in the extractor tube, and before reaching the upper rim of the funnel, passes the circular slit 2, at which stage water forced from the inlet pipe 4 into the annular channel enters the extractor tube. After passing the circular slit, the impurities are impelled by centrifugal force into the clean water, the latter being lighter and thus tending to move inward. The water thus traverses the suspension vortex and carries off fibers which offer stronger resistance. The purified suspension along with the added water moves upward in an inward vortex, the impurities accumulating at the bottom.

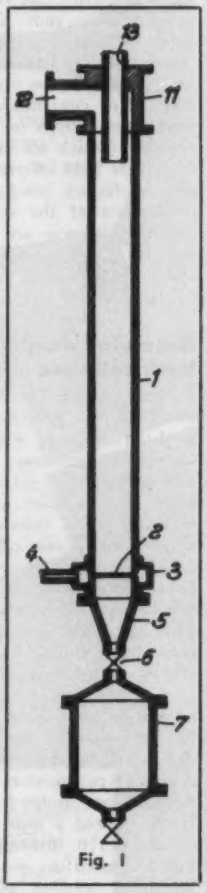


Fig. 1

## Treatment of waste sulfate liquor

U.S. 2,726,927, issued Dec. 13, 1955, to Hilding O. V. Bergstrom and Karl G. Trobeck, and assigned to Aktiebolaget BT-Metoder, relates to a process of treating waste sulfate liquor ("black liquor"), prior to concentrating by removal of water, in order to reduce losses of sulfur.

The usual manner in which waste sulfate liquor is evaporated causes great quantities of $H_2S$ to escape. The liquor will frequently lose from 2 to 10 kg. of sulfur calculated on the basis of one ton of pulp produced, in the form of $H_2S$, mercaptans, and organic sulfides. The sulfur loss will occur partly during evaporation to form so-called "thick lye" and partly when this is dried.

In order to prevent this loss, the inventors oxidize the sulfur before evaporation, thereby "fixing" the sulfur in the liquor. The oxidation may be effected by means of air in towers through which the liquid flows downward in contact with the air, or in other known ways. The oxidation is carried far enough so that subsequent evolution of $H_2S$ is prevented, but not far enough that organic compounds are oxidized.

By virtue of this oxidation, an increase in the sulfur content of the digesting liquor is obtained, as well as a reduction in the consumption of lime in the causticizing process for regenerating


*Patent attorney, 17600 Pinehurst, Detroit 21.

the digesting liquor. Other advantages are that the condensate and gases formed during evaporation will be free of poisonous substances such as $H_2S$, and that the treated liquor is less corrosive in pipes, storage tanks and evaporators.

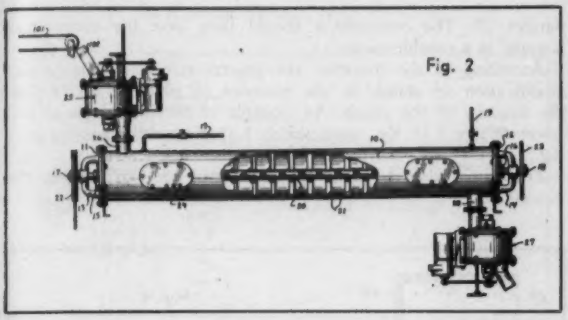


Fig. 2

### Continuous pressure cooking system

U.S. 2,706,148, issued April 12, 1954, to Hans J. Knapp and assigned to Grenco Inc., provides a continuous pressure cooking system for processing wood chips with steam preparatory to further processing.

As shown in Fig. 2, the cooking system consists primarily of a cooking drum 10, with a rotatable shaft 20 running through its length. The shaft carries L-shaped vanes 21. Steam is supplied through pipes 19. The material to be cooked is continuously supplied by a feed unit 25, which is described in detail in the patent, and the cooked material is continually discharged from the opposite end of the cooker by a discharge unit 27, which is also described in detail in the patent. The material is conveyed from one end of the cooker to the other by the vanes 21.

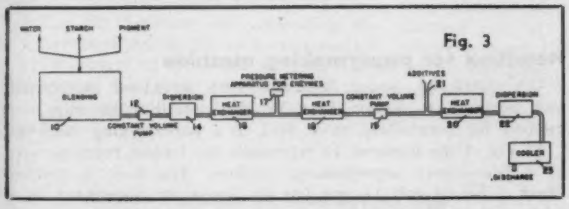


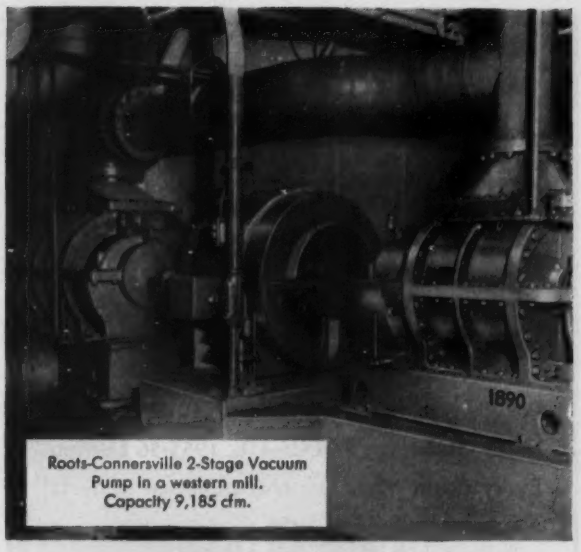

Fig. 3

### Preparing a paper coating composition

U.S. 2,717,213, issued Sept. 6, 1955, to Gilbert Stevens and assigned to Minnesota & Ontario Paper Co., describes a new process for preparing coating compositions for paper which are claimed to have higher gloss, smoother surface, and better adherence to paper.

The method is shown in Fig. 3. The ingredients, pigment, starch and water, are introduced into a blending apparatus such as a Z-Bar mixer 10. If a dispersing agent for the clay, such as tetra-sodium-pyrophosphate is to be used, it is added with the other materials to the Z-Bar mixer. Generally a small amount of protein for the purpose of satisfying the protein demand of the clay is added so that less enzyme will be required. The material from the blending apparatus goes to a dispersing apparatus 14. After the material is dispersed it is transferred to a heat exchanger 16, where the temperature is raised to bring the starch of the composition to almost the jell point.

The heated material flowing from the exchanger has introduced into it a suitable amount of enzyme. The heated material after the introduction of the enzyme flows through a heat exchanger 18 where the temperature is raised to convert and cook the starch in the composition. The material from the exchanger 18 passes to a heat exchanger 20 where the temperature is elevated to the point sufficient to inactivate the enzyme. It is desirable where dimethylol urea and similar acting chemicals are added to coating composition to mix the chemicals by means of a dispersing ap-


Roots-Connersville 2-Stage Vacuum Pump in a western mill. Capacity 9,185 cfm.

**VACUUM PUMPS COST LESS WITH R-C *plur-ability***

Users' performance records prove the long-time economies of Roots-Connersville Vacuum Pumps. These profitable results are gained from the exclusive combination of R-C *plur-ability* values:

- **Reduced horsepower at higher speeds** (514 rpm and up) creates power savings up to 25% and far lower first cost of motors.
- **Single-stage or two-stage units** in size ranges for all requirements.
- **Long-time reliability and low maintenance** no internal contacts or excessive wear. Almost complete freedom from down-time and maintenance.
- **Small floor space** less expensive foundations. Lower cost per cubic foot capacity. Adaptable to crowded space.
- **Minimum sealing water** from 4 gpm. to 40 gpm. Efficiencies not affected by changes in water temperature.

To get the most dividends from your investments in vacuum pumps, talk to Roots-Connersville users or ask for details in Bulletin 50-B-13.

**ROOTS-CONNERSVILLE BLOWER**
A DIVISION OF DRESSER INDUSTRIES, INC.
456 Walker Ave., Connersville, Indiana
In Canada—629 Adelaide St. W, Toronto, Ont.

**A WAY TO INCREASE MILL PRODUCTIVITY . .**
***without adding to costs!***

*Burtonite* **#7**

For details, see page 233 of PAPER AND PULP MILL CATALOGUE, 1955-56 Edition. Every claim made for this new raw material was substantiated in 1955.

Order enough No. 7 for it to speak for itself.

**THE BURTONITE CO.**

*Member*

NUTLEY 10, NEW JERSEY
Telephone: NUtley 2-0031
*"Better Products . . . Through Research"©*



**...Stop Leakage! .....**

use **SEAMLEX**

THE SEAMLESS FLEXIBLE ALL-METAL **HOSE**

**SEAMLEX Hose Ensures Uninterrupted Production**

. . . because SEAMLEX is made of extra large, GENUINE SEAMLESS bronze tubing, helically corrugated by the exclusive SEAMLEX ROLL-IN PROCESS. Sturdily constructed throughout . . . Rugged reinforced end connections for added safety.

Largest range of stock sizes in bronze hose: 1/16" I.D. to 8" I.D. inclusive; most sizes also available in steel, stainless steel, monel and aluminum.

Write today for . . . FREE Bulletin #955 on SEAMLEX Quality Hose and Rotary Joints

SEAMLEX COMPANY INC

41-23 24th STREET, Dept. H
LONG ISLAND CITY 1, N. Y.

● *Since 1928, SEAMLEX Products are QUALITY Products.* ●


## Patent Reviews . . .

paratus 22. The composition should then have the temperature lowered in a suitable cooler 23.

According to the inventor, the process effects the continuous modification of starch in the presence of pigment to decrease the viscosity of the starch. An example of the formula is as follows: Water 5.25 Kg., corn starch 1.27 Kg., alpha protein 0.27 Kg., clay 8.48 Kg., enzyme 0.03 Kg.

The patent also describes apparatus used for carrying out the process.

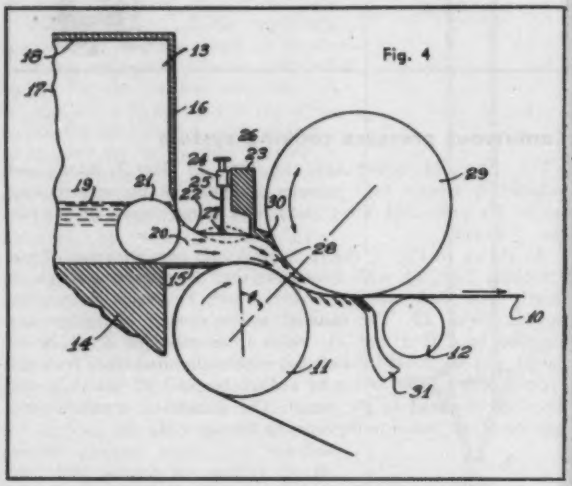


Fig. 4

### Headbox for papermaking machine

U.S. 2,718,824, issued Sept. 27, 1955, to Lloyd Hornbostel and assigned to Beloit Iron Works, describes an improved method for controlling stock feed to a papermaking machine.

In Fig. 4 the numeral 10 represents the looped forming wire of a fourdrinier papermaking machine. The wire is trained about a breast roll 11 and has its upper run supported on a table roll 12. A stock feed device or inlet box 13 is mounted immediately behind the wire 10. Mounted on the inside of the inlet box 13 at the mouth of the outlet 20 is a rectifier roll 21. A second breast roll 29 is mounted closely adjacent to the forming wire 10 for metering the flow of stock. A fixed support 23 has a bottom shoe-like member 30 which forms a liquid seal between a flexible member 22 and the top breast roll 29.

The stream of dilute stock is delivered by way of the stock inlet box 13 and outlet 20 to the forming zone 28 at a pre-determined velocity. Such velocity may be controlled by the total hydraulic stock head, which, in turn, is controlled by suitable means for maintaining a predetermined head of stock in the inlet box and/or by a suitable means for maintaining a predetermined air pressure against the stock in the inlet box 13. In addition, the rate of flow of stock at various points along the outlet 20 may be controlled by coaction between the flexible sheet 22 and the adjusting members 25.

The stock flows from the outlet chamber onto the breast roll 11 and then into the forming zone 28. The velocity at which the stock flows onto the forming wire 10 may or may not be the same speed as that of the forming wire 10.

The water in the stock may pass freely through the forming wire 10 throughout the unsupported area of the forming wire 10. Accordingly, as the stock flows into the forming zone and onto the unsupported portion of the forming wire 10, the actual velocity of the water in the stock need not be appreciably slowed down since the water may pass directly downward and through the forming wire 10. The consistency

of the stock immediately above the forming wire 10, however, increases rapidly in the forming zone as the stock approaches the narrow passage or slice defined by the upper breast roll 29 and the forming wire 10. A baffle or deflector 31 is positioned below (but not supporting) the forming wire 10 in the region near the table roll 12 so as to deflect the flow of water passing through the forming wire.

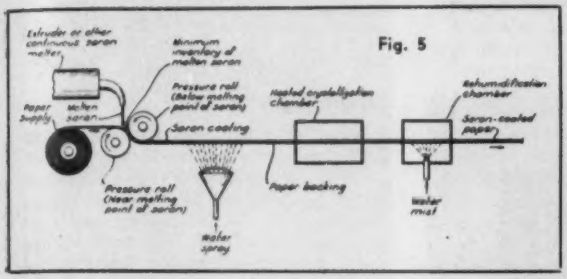


Fig. 5

## Coating paper with crystalline sarans

Saran coatings on paper are advantageous because of the inertness of saran to solvents and chemicals. However, saran tends to decompose upon relatively short exposure at or near its melting point. Another difficulty is the tendency for saran-coated paper to curl.

These difficulties are overcome by William F. Mick and Oliver B. Amley in U.S. 2,716,074. The patent was issued Aug. 23, 1955, and assigned to The Dow Chemical Co.

As shown in Fig. 5, the process consists of continuously melting a crystalline saran, supplying it continuously to a pressure zone, simultaneously feeding a strip of paper to the pressure zone, bringing the paper and the molten polymer continuously into contact, pressing the polymer to a uniform thickness on the sheet, spraying the uncoated side of the paper with water while the polymer on the coated side is still non-crystalline, subjecting the sheet to a temperature at which the polymer crystallizes rapidly for a time sufficient to crystallize the polymer and subjecting the uncoated side of the paper to a rehumidification treatment to restore a normal moisture content to the sheet. Recrystallization is accomplished by conveying the coated paper through an oven at 75-95°C. At this temperature, crystallization is completed within 10-20 seconds.

## Other Patents of Interest to the Pulp and Paper Industry

| Subject | Inventor or Assignee | Patent No. | Date |
|---|---|---|---|
| Bottle carrier convertible to a toy | Gardner Board and Carton Co. | 2,723,488 | 11/15/55 |
| Formless paper box machine | International Paper Box Machine Co. | 2,723,603 | " |
| Carton for packing electric lamps | Douglas S. MacKenzie | 2,723,795 | " |
| Partition tray | George V. Malingren | 2,723,796 | " |
| Cover locking and reinforcing device for a container | Gaylord Container Corp. | 2,723,797 | " |
| Knock-down cardboard display cradle | Elnson-Freeman Co. Inc. | 2,723,820 | " |
| Method of impregnating multilayer paper insulation | Carl G. Munters | 2,723,923 | " |
| Fibre conduit | McGraw-Electric Co. | 2,724,189 | 11/22/55 |
| Machine for applying plasticizer to paper | Nicolet Paper Corp. | 2,724,363 | " |
| Pallet package with strip mounted legs | Consolidated Paper Co. | 2,724,496 | " |
| Packages for frozen peas | Peter Schenk | 2,724,539 | " |
| Packaging tray and blank | Bestpak Inc. | 2,724,540 | " |
| Collapsible carton and fruit pack | Stevens & Thompson Paper Co. | 2,724,542 | " |
| Tray for glassware and other fragile articles | Container Corp. of America | 2,724,542 | " |
| Stereoscopic viewer consisting of a cardboard box | Jesse Levine | 2,724,991 | 11/29/55 |
| Making of paper sheets or cards | Masson Scott & Co. Ltd. | 2,725,002 | " |
| Ice cream sandwich package | Rite Pack Co. | 2,725,178 | " |
| Process of treatment of cellulosic materials to impart flame resistance | Dow Chemical Co. | 2,725,311 | " |
| Jordan engine plug | John W. Bolton & Sons Inc. | 2,725,795 | 12/ 6/55 |
| Manufacture of printing paper | Paper Patents Co. | 2,725,796 | " |


SPEED & PRECISION in MOISTURE MEASUREMENT

by

MARCONI

$325 • A-C POWERED

$285 • BATTERY OPERATED

The most versatile and accurate instrument yet designed, this Marconi Model TF-933A Moisture Meter has been developed and exhaustively tested in England for over three years, and is now available to American industry.

Excellent results may be obtained on most organic substances, with an accuracy of ± 0.2% under controlled conditions. No special skills are required and precise measurement takes less than a minute. Supplied with temperature compensation scales. Range for pulp 6-22%—for paper 4-13% with special electrode available to extend range down to 2% and also sword type electrodes for inner stack measurements. Chart calibrations also available for 150 other substances such as grains, tobacco, flour, etc. Immediate delivery from New York stock, with service and spares available.

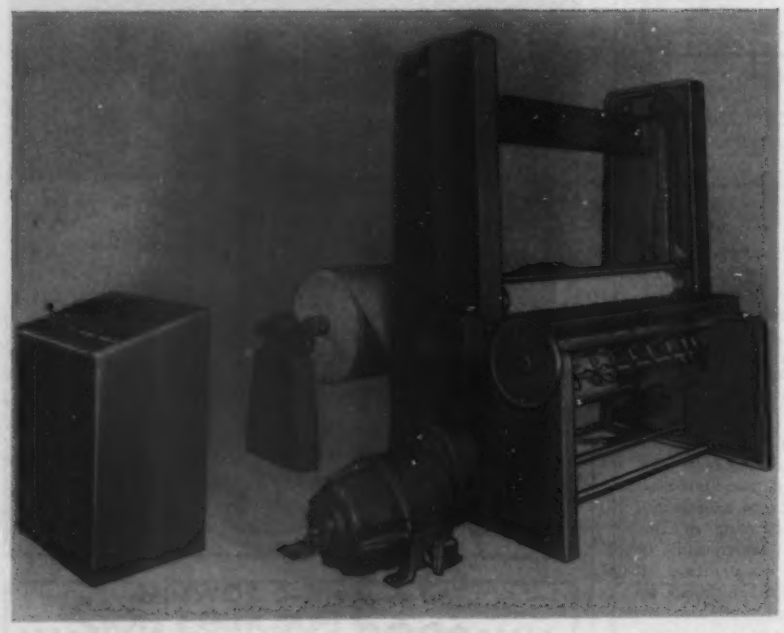
*Another valuable addition to the ever-growing TMI line. Write TODAY for technical data and ask for your catalog.*

TESTING MACHINES, INC.

MANUFACTURERS AND DISTRIBUTORS OF THE FINEST TEST EQUIPMENT.

123 West 64 Street, New York 23, New York

# NEW PRODUCTS



### Slitter-rewinder

A new line of slitter-rewinders for converting operations marks the entry of Black-Clawson into this field. The newly designed Model TD-4 is based on proved principles of slitting and rewinding and incorporates a number of major design improvements. There is a riding roll overdrive insuring tight starts, controlled pneumatic engagement of slitters, ball bearings mounted and positive axial locking of core winding shaft and extensive use of standard readily available commercial items.

The machine is made in widths of 42, 52 and 62 in. with speeds up to 1000 fpm. It is equipped with 4-in. diameter drums and has a rewind capacity of 30 in. It can be furnished for score or shear type slitting.

This model, with three others, provides a complete line of this type for rolls up to 72 in. in diameter and widths to 130 in. *Black-Clawson Co., Dilts Machine Works Div., Fulton, N.Y.*

### Portable radiophone

This transistorized portable two-way radiophone delivers up to 20 times the RF output conventionally attained in such equipment. The complete line includes models with RF output ratings from 1 to 8 watts. Weight and size has been reduced; the lightest and smallest weighs only 7 lb., 9 oz. The extensive utilization of transistors, including use in transistorized power packs, also extends battery life for minimum operating costs.

Another feature of the equipment is the "snap-on" power pack. Dry cell, wet cell and 117 VAC power packs are interchangeable.

Models in the 25-54 mc and 144-174 mc frequency range in both handset type microphone and speaker-palm type microphone versions are available. Optional accessories provide for all types of operation in all services in these frequency ranges. *Motorola Communications & Electronics Div., 4501 Augusta Blvd., Chicago 51, Ill.*

### Self-priming stainless steel pump

These stainless steel pumps have been developed for installations which require the unusual features of the flex-i-liner pump design, as well as the rigidity of stainless steel construction, particularly where the need to connect the pump to a stainless steel pipe line exists. Available in either type 304 or 316 alloy, the pumps are self-priming and avoid the use of gaskets or check valves. The flex-i-liner design eliminates the need for stuffing boxes or shaft seals. *Vanton Pump & Equipment Corp., 201 Sweetland Ave., Hillside, N.J.*

### Diaphragm valve

Straight-through flow with no dam to trap suspended matter is one of several outstanding advantages of this diaphragm valve. Providing two-way, leakproof control of acids, oils, alkalis, slurries, and most hard-to-handle fluids, this self-draining valve gives an unrestricted path for fluid to pass across the smooth valve floor, keeping pressure up and eliminating the necessity of clean-out ports.

The diaphragm is molded in the "as closed" position to save maintenance costs by cutting down strain when the valve is tightly closed. No packing is necessary, for the fluid cannot come in contact with the valve stem or working parts at any time under normal conditions. *Stockdale Engineering Co., Haddonfield, N. J.*

### Anti-static agent

This 100 per cent active powdered antistatic agent has excellent dispersibility and is compatible with most surface sizing materials. It is used for the elimination and control of static and dust in the manufacture of paper. Suggested for use in tub sizing operations, the application of tub size is normal and no modifications in method of application or drying are necessary.

The agent forms substantially neutral solutions and is compatible with nonionic and cationic materials. It is stable to hard water and polyvalent salt solutions. *W. H. & F. Jordan Jr. Mfg. Co. Inc., 2126 E. Somerset St., Philadelphia 34, Pa.*

### Remote control device

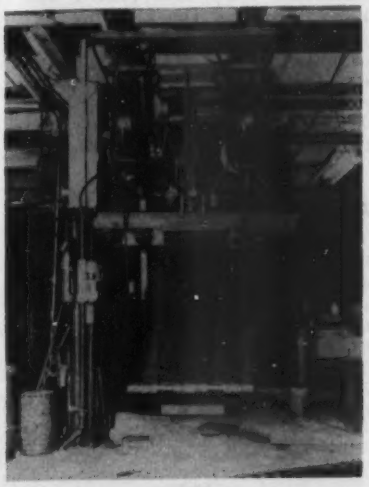
This fully automatic remote control device will function on electric motors from 5 to 150 hp, 220 or 440 v. It is activated by either an overload or underload current signal and responds instantaneously on both the stop and start function. It is capable of controlling a single motor or a group of motors, working through the motor starter by means of a solenoid and a coil-activated mercury switch. *Rietz Mfg. Co., Santa Rosa, Calif.*

### Fuel oil additive

A new additive for no. 4, 5 and 6 oil features an unusual gel breaking detergent action. It is non-corrosive and non-explosive and has a flash point of 206°F.

The additive is designed to break up oil-water gels, dissolve sludge, and emulsify water in the oil. The fuel system thus remains clean from fuel tank to chimney because all the oil purchased is consumed at peak atomization efficiency.

A free demonstration kit is available. *Stewart-Hall Chemical Corp., P. O. Box 66, Fleetwood Station, Mount Vernon, N.Y.*



### Pallet load compressor

A device for compressing loosely stacked materials on pallets such as knocked down cardboard cartons applies compression to the top of the pallet load, enabling the operator to strap the load onto the pallet with steel strapping. The operation results in a square pallet load which gives stability in the stacking of these loads.

The unit can be supplied either as a stationary or mobile unit. The mobile compressor is mounted on a monorail for traveling along a storage conveyor line to enable the operator to strap a number of pallet loads without waiting for the pallets to be removed from the conveyor line. The unit operates by means of pushbutton, and a power unit can be provided to move the compression device along the monorail by means of electric pushbutton. *Beacon Machinery Inc., P. O. Box 188, East St. Louis, Ill.*

### Flex-i-liner pump

The new XB series plastic Flex-i-liner pump is available in 10-, 15- and 20-gpm sizes and discharge pressure ratings of 0 to 50 psi. These new pumps incorporate the basic features of the Flex-i-liner design which eliminate the need for stuffing boxes or mechanical seals. The fluid passing through the pump is never in contact with metal as contact is made only with the outer surface of the Flex-i-liner and the inner surface of the pump housing. These two are offered in a wide variety of plastic and natural or synthetic materials of construction enabling the pumps to handle extremely corrosive chemicals, abrasive slurries or fluids which must be maintained free from contamination.

The new series in higher capacity ratings offers a heavy-duty continuous operating production pump. The only wearing replacement item is the inexpensive Flex-i-liner, which the XB type mounting permits to be replaced without removal of pump mounting, motor connections or pipe lines. *Vanton Pump & Equipment Corp., 201 Sweetland Ave., Hillside, N. J.*

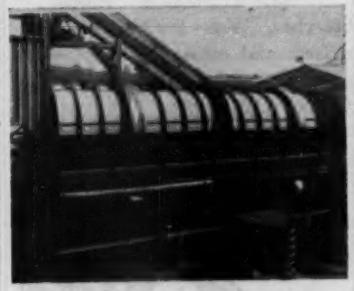
### Level indicator

An improved type material level indicator for process industries is now offered which will function positively at bin temperatures up to 300°F. Suitable for all dry, pulverized, fine, crushed or granular materials, it can also be adapted for use with corrosive materials, with all exposed parts built of stainless steel.

The indicator may be mounted either vertically or horizontally. The mechanism consists of a paddle wheel rotated by a 10-watt electric motor. When incoming material reaches the level of the paddle wheel, shaft movement is restrained. The motor, located externally, revolves on its shaft until it contacts two microswitches, which flash a signal either to the operator or di-


**Convert Logs into High-Quality Chips**

***Step 1 — Remove the Bark***



**CARTHAGE BARKING DRUMS**

thoroughly remove the bark with minimum brooming of the logs. Heavy all-welded design with full-length plates results in long service life and low maintenance.

*Write for Complete Information*

**CARTHAGE MACHINE COMPANY**
CARTHAGE, NEW YORK

**Greater Production of Higher Quality Pulp**

***• in Less Time***

***• at Lower Cost***

This is the end result of the various processes and equipment which we have installed in pulp mills throughout North America. Send us details of your requirements.

**Chemipulp Process Inc.**
**Woolworth Bldg. Watertown, N.Y.**

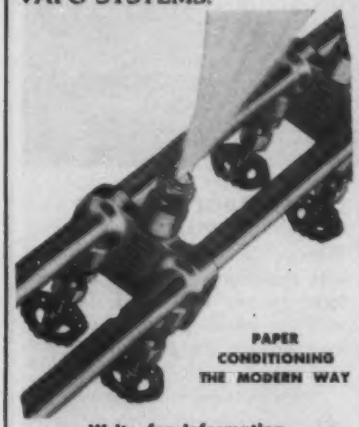
***Associated with***
**Chemipulp Process Ltd., 403 Crescent Bldg., Montreal**

***West Coast***
**A. H. Lundberg, Orpheum Bldg., Seattle**
**Lundberg-Ahlen Equipment Ltd., 146 E. Broadway, Vancouver**

**Vapo Systems**

is the only practical method of conditioning paper during manufacturing operations, and in all converting processes.

Starches, Wax Emulsions, Plasticisers and other finish improvement solutions can be sprayed by VAPO SYSTEMS.



PAPER CONDITIONING THE MODERN WAY

*Write for Information*

Vapo Systems

132 W. Home Ave., Villa Park, Ill.

GRATON AND KNIGHT

**G&K INDUSTRIAL LEATHERS**

GRATON & KNIGHT Company

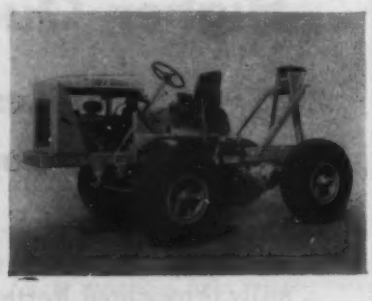
WORCESTER, MASSACHUSETTS


rectly to the feed supply. Because the motor frame must rotate through a considerable distance before it contacts the switches, false signalling caused by clumps of material striking the paddles is avoided. *Fuller Co., Catasauqua, Pa.*

### Stainless tubing tester

Producers of a new electrically energized instrument for the nondestructive testing of austenitic stainless steel tubing believe their product will give closer and more critical quality control than ever before possible. The unit inspects the inside and outside diameter surfaces of tubing along the full length and around the entire periphery at production speeds. It also tests the complete wall thickness or sub-surface of material with walls up to 0.070 in. At present the unit tests full finished, nonmagnetic types of stainless steel tubing with outside diameters ranging from ¼ in. to 3¼ in.

Sensitivity control makes possible adjusting the instrument to indicate defects of pre-determined magnitude. Audio-visual signals warn the operator as a defect passes through the testing coil. *Carpenter Steel Co., Alloy Tube Div., Union, N. J.*



### Pulpwood skidder

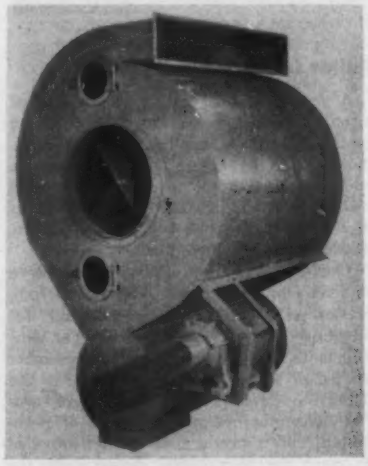
A new rubber-tired skidder, entirely redesigned after exhaustive field testing, is engineered to skid, tow, haul or winch logs and pulpwood out of the woods in a single-unit operation requiring no trailing sulky or arch. With driving power to all four wheels, the Blue Ox can travel over extremely difficult terrain at 5 mph and over fair skidding roads at 10 mph, moving two cords of pulpwood, 800 ft. of hardwood, or up to 1500 ft. of softwood. It can be driven from job to job at 45 mph.

New features include an SD-240 engine, New Process 275 transmission, front-spring slipper mounts which permit front wheels to oscillate up to 18 in. vertically, redesigned integral rear A-frame, and an alloy steel frame restyled for better weight distribution and balance. The vehicle has standardized low-pressure 14.00 x 20-in., 12-ply rubber tires with 72-in. tread.

Costs of operating range as low as 35-40 cents an hour. Front and rear-mounted winches are optional equipment. Complete stability in side winching is assured by the solid mount rear axle. *Four Wheel Drive Auto Co., Clintonville, Wis.*

### All-purpose hose

A new, advance type of all-purpose hose is described as suitable for use with air, oil, water and mild chemicals. The newest addition to the R/M line of hose, it is the first all-purpose hose of mandrel-made, horizontal construction. Two of its advantages are extremely long life and complete resistance to kinking. *Raybestos-Manhattan Inc., Manhattan Rubber Div., Passaic, N. J.*

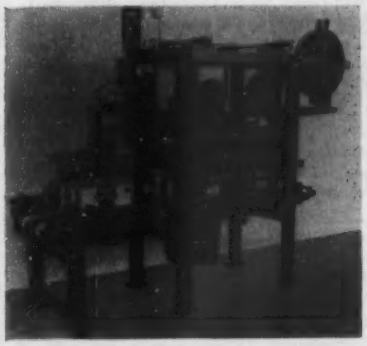


### Tangential separator

An improved device for pneumatic conveying, which has been used extensively in the tobacco industry, is now being generally introduced for the handling of dry and semi-dry fibrous materials such as: woodchips, sawdust, woodflour, dust and paper broke. Available in a wide range of sizes which will handle up to 12,000 cfm, the separator separates all material down to 30 microns, permits air to be returned to room and does not affect temperature of product.

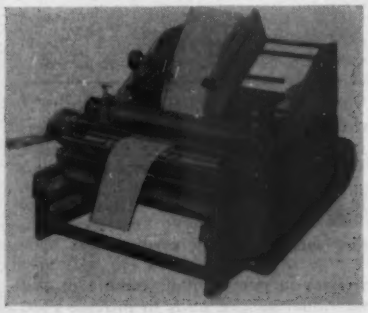
In operation, the air stream entraining the material to be separated enters the machine at a required and pre-determined velocity. The material is thrown to the perimeter of the tangential shell and conveyed into an air lock for discharge. Conveying air circulating at high speed around a louvered screen in the center of the shell assists further separation of smaller particles, causing them to join the larger particles in the lock. Clean air continues to be discharged through the screen. *Cardwell Machine Co., P.O. Box 1359, Richmond 11, Va.*

## New Products . . .



### Single strip tape sealer

This new machine automatically tapes 25 or more cases per minute, single-strip, top and/or bottom flaps only, plus end panels, as required. Tape sealing is dust and pilfer-proof and permits easy opening without injury to container, contents or person. The machine has a minimum length of 7 ft. *General Corrugated Machinery Co., Palisades Park, N.J.*



### Coating machine

This new coating machine is equipped with semi-automatic friction demand feed. Speed of delivery of coated materials is controlled by the operator. Any coating material—glue, latex, varnish, resin, paint, thermoplastics—can be applied from a 1-in. strip to an over-all coating job on materials of any weight. A coating regulator dial controls the thickness desired. It is readily adjustable for vairous label sizes. Tank roller and tank are easily removable for quick cleaning. *Potdevin Machine Co., 285 North St., Teterboro, N.J.*

### Scale remover

Removing scale from liquor heater tubes with this compound by the circulation method assures dissolving and removing the scale completely. Since the compound is inhibited, the metal is not harmed. The circulation method saves downtime required for such methods as rodding, soaking or dismantling and scrapping. The progress of the descaling work is easily determined, using titrating equipment provided without charge by the manufacturer.

Cost of material for descaling is low since two or more heaters can be descaled with the same solution. The used solution can be brought up to required strength by adding fresh compound. This effective descaling procedure improves the heat transfer of the unit, making it more efficient. *Oakite Products Inc., 19 Rector St., New York 6, N.Y.*

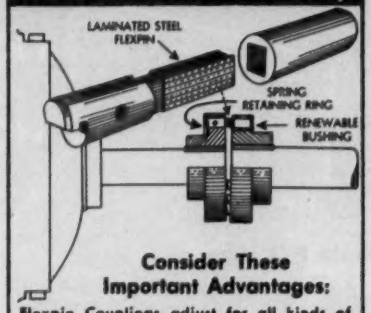
### Package handler

For rapid handling of cartons and packages without pallets, a new handler has been introduced for Hyster Co.'s 3000-and 4000-lb. capacity lift trucks. The arms will accommodate packages from 22⅛ to 70¾ in., holding them firmly without spilling or damage. Arms are said to operate faster than comparative models and the side-shaft feature permits faster positioning. *Hyster Co., 2902 N.E. Clackamas St., Portland 8, Ore.*

### Rotary laminating press

A new rotary laminating press is suited especially for contact bond adhesives and assembly line production of laminated panels. Its pressure system insures good bond because of vertical alignment of the pressure rolls regardless of panel thickness. The unit is provided with a positive nip adjustment for precise setting of pressure roll gap for panels up to 5 in. With this gap established the machine can


**STOP BEARING FAILURES ...shaft misalignments the FLEXPIN COUPLING Way**




**Consider These Important Advantages:**

Flexpin Couplings adjust for all kinds of shaft misalignments in all directions.
Act as safety device; prevent motor and machinery damage.
Expect and get 8 years and more service life from Flexpins.
Maintenance without moving connected shafts. No costly shut-downs.
. . . Easily mounted, aligned. Connected without special tools. Run in either direction; no backlash. Noiseless. Simple and safe. Reasonably priced; quick shipment.
Write today for Bulletin #53
(Parts for FRANCKE Couplings)

SMITH & SERRELL INC.
FLEXIBLE COUPLINGS
205 WASHINGTON ST., NEWARK 2, N. J.



# PAPER AND PAPERBOARD MAKING

By HARRY WILLIAMSON
Consulting Engineer and Author of
LESSONS IN PAPER MAKING

Pocket size, cloth bound text book of 372 pages covering all phases of stock preparation and sheet formation including the fundamental principles of making paper on the fourdrinier machine and paperboard on the multiple cylinder machine.

The author has fulfilled a life-long ambition to translate nearly fifty years of practical experience in a book that will be useful to the practical papermaker, technologist and executive.

Price $6.00 prepaid with order

Published by
FRITZ PUBLICATIONS, INC.,
431 So. Dearborn Street, Chicago 5, Illinois

## New Products . . .

be left in operation and panels are automatically pulled through the press opening at speeds ranging from 15 to 30 fpm. The unit can be loaded up to 8000 lb. with 8-in. diameter direct-acting pneumatic cylinders, which results in 150 lb. psi on a 48-in. panel. *Rodney Hunt Machine Co., Orange, Mass.*

### Rigid PVC pipe

Rigid unplasticized PVC (polyvinyl chloride) pipe has been added to the line of stainless steel tubing and pipe offered by Alloy Tube Div., Carpenter Steel Co.

Two types are offered—a normal impact grade with high chemical resistance and a high impact grade with slightly less chemical resistance but much greater strength. Threaded and socket types of fittings are available. Both types are easily fabricated on standard metal and woodworking equipment.

The materials are one-half the weight of aluminum, with friction loss about one-half that of steel. The pipe is non-toxic, odorless, tasteless, non-porous, non-contaminating, abrasion resistant, non-flammable and non-electrolytic. Both types are furnished in diameters from ½ to 4 in. in 10- and 20-ft. lengths with plain ends. *Carpenter Steel Co., Alloy Tube Div., Union, N.J.*

### Sectional belt conveyors

Pre-built sectional conveyors in standardized pre-engineered units in capacities ranging up to 1500 tons per hour incorporate standard Link-Belt components, including the new series 50 belt idlers, with sectional truss frames and structural steel supporting bents. They are built in 18-, 24-, 30- and 36-in. belt widths, with 24- and 42-in. deep trusses. Drives range up to 40 hp.

The conveyors are built in the plant nearest the jobsite, and components are shop-assembled for easy installation. They are particularly adapted to operations where low initial cost and portability are especially important. Of heavy truss-frame construction, they offer a high degree of rigidity and strength per pound of weight. Operating in horizontal and inclined paths, they can easily span rivers or valleys or follow land contours. *Link-Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill.*

### Cable conveyor buttons

Cast iron conveyor buttons used on cable conveyors which carry pulp logs from the feeding flume to the wood room are lasting ten times as long when they have been hard-faced with Colmonoy alloy. Recent field tests showed that best results are obtained with a uniform bead of Colmonoy No. 6 alloy welded to the circumference of the disc-shaped button ends.

A secondary advantage is increased trough life. The low coefficient of friction of the wear-proofing alloy reduces the amount of wear and damage to the trough where it contacts the cable button.

The hard-facing material used in the cable button reclamation method is a non-magnetic chromium-boron-nickel alloy which produces a surface hardness of 56 to 61 on the Rockwell C scale. *Wall Colmonoy Corp., 19345 John R. St., Detroit 3, Mich.*

### Automatic production cutter

An automatic, high-speed production cutter converts bookbinding materials at the Burkhardt Co. of Detroit. The machine slits and cuts to size and delivers to a stacker varying materials including such stock as vinyl coated fabrics delivered from rolls.

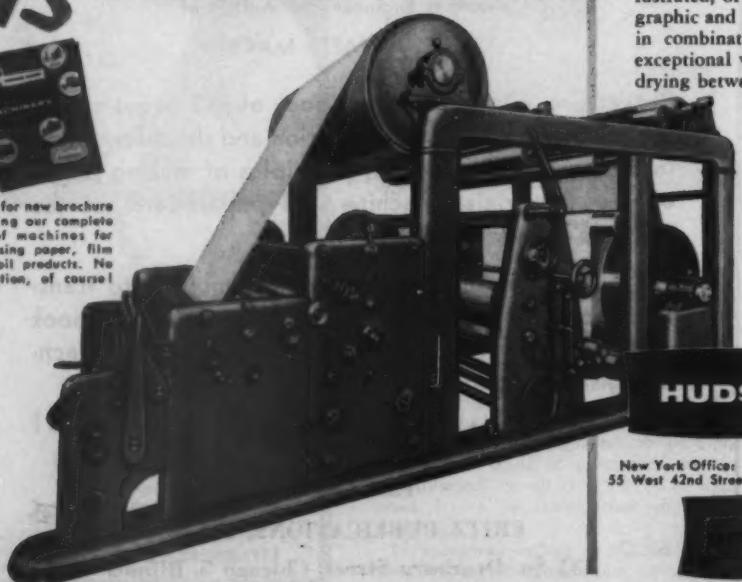
Materials up to 60 in. wide are handled at a high production rate, depending upon length of cut. In a typical operation, 24-in. lengths are cut at a rate of 1800 pieces per hour. *Hobbs Mfg. Co., 282 Salisbury St., Worcester 5, Mass.*


**Print or Tint Heavy Papers and Boards**

*in Beautiful, Sales Appealing, Color Combinations*

**HS PRINTER-TINTER**

Write for new brochure showing our complete line of machines for processing paper, film and foil products. No obligation, of course!



***High speed production in 4 different processes!***

1. Flexographic printing or tinting only
2. Flexographic tinting with roto overprinting
3. Rotogravure printing and tinting only
4. Rotogravure tinting with flexographic overprinting.

Two printing processes in one — either combined, as illustrated, or in individual ganged units to provide Flexographic and Rotogravure printing in dual operations. Used in combination, these two print processes give you an exceptional wide range of decorating possibilities. Instant drying between processes is accomplished with 48" diameter steam drying rolls—one for each of two operations. Machine is built to any size web from 50" to 90" and processes sheet up to unit capacity. Double drum rewinders with slitters may be furnished, if desired. Machine is driven by horizontal shaft equipped with bevel gears and clutch throw-outs for each unit. Simplified construction permits addition of more colors in either Flexographic or Roto. Write for complete details — Model No. 3-RA.

**HUDSON-SHARP machine company**

New York Office: 55 West 42nd Street

WRAPPERS • PRINTING PRESSES • WAXERS • EMBOSSERS • ROLL WINDERS • FOLDERS • LAMINATORS

# CLASSIFIED ADVERTISING

## SUPERINTENDENT

A superintendent or foreman of superintendent calibre who has had experience in the manufacture of solid board for insulation, decorative type boards, acoustic tile, and hardboard is needed to assist in the building of a new mill and when built to be in charge of its operation. This mill will be located in Quebec Province. Reply in confidence, giving personal, education and work history, including references and salary desired to Box 625, The Paper Industry.

## FOREMEN

Three foremen or men of foreman calibre who have experience in the manufacture of solid board for insulation, decorative type boards, acoustic tile, and hardboard are needed to assist in the building of a new mill and when built to be in charge of shift operations. This mill will be located in Quebec Province. Reply in confidence, giving personal, education and work history, including references and salary desired to Box 626, The Paper Industry.

**ATTENTION SUPERINTENDENTS & CHEMISTS**

If you have an idea on a chemical product for the paper industry or outlet for existing products, we will duplicate, develop, finance, manufacture and market. Confidential. Write Box 620, The Paper Industry.

**CONFIDENTIAL EMPLOYMENT SERVICE**

For paper and pulp mills and paper converting plants. Our service is rendered without charge to employers seeking executives. No fee to be paid by applicant until position is accepted. We will welcome an opportunity to be of service.

**CHARLES P. RAYMOND SERVICE, INC.**
294 Washington St. LIberty 2-6547 Boston 8, Mass.

Papermaking or chemical engineering graduate under 40 with technical experience in paper or paperboard. Man selected will do product and process development work in a progressive midwestern board mill and converting plant. Salary will be commensurate with experience and capability with excellent advancement opportunities. In replying, send complete background of education and experience along with salary requirements to Box 623, The Paper Industry.

**WANTED**

Design engineers — mechanical experience automatic machinery desirable also plant layout board or pulp plants. Salary open. Reply in first letter giving details, training, experience, references and present salary range. Location south. Address replies to Box 624, The Paper Industry.

**WANTED —**
**BLEACH PLANT FOREMAN AND OPERATORS**

We want men with heavy background and experience in the operation of a modern kraft bleach plant. We offer:

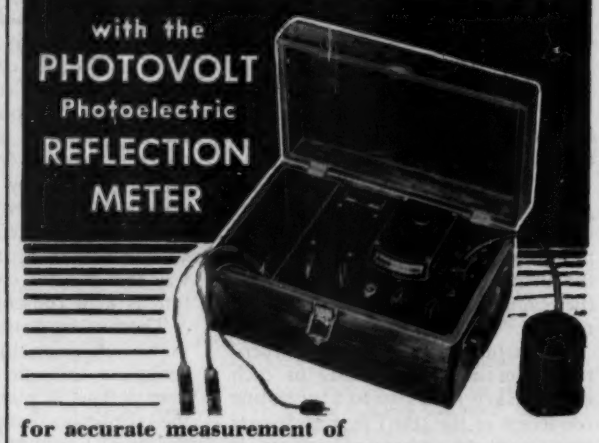
1) An opportunity to join one of the leading and most progressive paper manufacturers in the country.
2) A position with unlimited potential — definite security.
3) Excellent living and working conditions — our new mill is located in central Florida, midway between Jacksonville and Daytona Beach.
4) Salary which will justify a move for the right man.
5) A retirement plan to which all funds are contributed by the company.
6) Many benefits — i.e., Group Life Insurance, Hospitalization and Surgical Insurance, etc.

Send complete resume to Hudson Pulp & Paper Corp., 477 Madison Avenue, New York 22, New York, Attn: Mr. D. Brody.

**For a list of twelve publications of special interest to papermakers, see the following page.**


# You Can Be Sure!

with the
PHOTOVOLT
Photoelectric
REFLECTION
METER



for accurate measurement of
*Brightness and Opacity*
of pulp and paper in terms of TAPPI specifications.
Also for *Gloss and Color*
tests on paper, cardboard, and other paper products.
Portable, reliable, rugged, simple to operate
***Also: Colorimeters, pH Meters***

PHOTOVOLT CORP.
95 MADISON AVENUE NEW YORK 16, N. Y.

# READ THIS GROUTING GUIDE

**... before you Grout another piece of heavy equipment**

Send for this *free* grouting guide which clearly illustrates 11 common machinery settings, methods of grouting and forming, and hot and cold weather grouting. Discussion covers proper mixing and placing of grout, reasons for using prepared, non-shrink grout, etc.

DIVISION OF AMERICAN-MARIETTA COMPANY
the MASTER BUILDERS co.
CLEVELAND 3, OHIO TORONTO 9, ONTARIO

## Spiral heat exchanger

(Continued from page 33)

gester is connected to the continuous relief header) and enter it directly into the tower.

### *Heat recovery equipment in sulfite digester house*

The flow sheet (Fig. 2) shows the general layout of the Rosenblad heat recovery equipment in a sulfate pulp mill digester house. With reference to the item numbers of the flow sheet, the equipment works in the following manner:

The relief vapor from the turpentine relief at the beginning of each cook is taken *via* a trap to a turpentine condenser of the spiral heat exchanger type, item 12, where the vapor is condensed and the condensate cooled down to some 85°F. In this condenser hot water is produced, and the hot water temperature is kept constant by means of the temperature controller, item 13.

The relief vapor from the end relief are similarly cooled in an end relief condenser, item 10, and the temperature of the hot water produced kept constant by means of the temperature controller, item 11.

At the end of each cook the digesters are blown to the diffusers, and the flash vapor is taken *via* a trap to the blow-steam condenser plant and is there condensed in the jet condenser, item 1. The hot condensate is taken to the top of the condensate accumulator, item 9. Cooling medium for the jet condenser is cold condensate, which is pumped from the bottom of the accumulator by means of the circulation pump, item 4. The temperature controller, item 3, controls the amount of cooling medium in such a way that the hot condensate temperature is kept constant at some 195°F.

The hot condensate is continuously drawn off from the top of the accumulator through one of the filters, item 8, and is pumped by means of the circulation pump, item 6, through the spiral heat exchanger, item 5, and then returned to the bottom of the accumulator. The temperature controller, item 7, will keep the cooled condensate temperature constant.

Cooling medium for the spiral heat exchanger, item 5, is preferably water, which has been preheated to about 115°F, in a surface condenser of the spiral heat exchanger type, condensing the vapor coming from the last effect in the evaporation plant. The water can then be further preheated to about 160°F. By thus connecting the surface condenser of the evaporation plant in series with the heat exchanger in the blow steam condenser plant, a larger amount of hot water can be produced than if cold fresh water were to be heated in the heat exchanger, item 5.

Any blow vapor that is not condensed in the jet condenser, item 1, is separated from the condensate in the top of the accumulator and condensed in the after condenser, item 2. Cooling medium for this condenser is cold condensate, which is circulated by means of the pump, item 4.

It is claimed by the patentees that the Rosenblad channel switching method for evaporating sulfite waste liquor has been further developed these last years, and about a dozen installations are running in Sweden, Norway, France and North America. These plants are built with all passages for liquor and for condensate of identical design, thus permitting, by switching of the passages every eighth hour, the cleaning of former liquor passages by condensate. The evaporation of sulfite waste liquor under back pressure is also possible, and some of the above mentioned plants are using back pressure steam for heating of alcohol distillation columns, digesters and paper machines.


**BIG TANKS...or small**

100,000 gallon storage tank for 10% spent sulphite liquor at temperature of 175° F. at Northern Paper Mills (Division of Marathon Corp.), Green Bay, Wisconsin. 26' inside diameter, 25' high, 6" Douglas Fir.

***Kalamazoo* WOOD TANKS**

*...quality-built to your specifications*

Engineering experience, craftsmanship, selected top-grade tank lumber . . . your guarantee of satisfaction. For large tanks or small, see *Kalamazoo* first. Free estimates and suggestions.

WOOD TANK DIVISION

*Kalamazoo* TANK and SILO CO. 427 HARRISON STREET KALAMAZOO, MICH.

***Stadler, Hurter***

& Company

CONSULTING ENGINEERS

Specializing since 1923 in all phases of design, modernization and expansion of pulp and paper mills from forest to finished product.

*HEAD OFFICE:* DRUMMOND BLDG., MONTREAL

*New York Office:* 76 Beaver Street

**Twelve Publications for Papermakers**

| | |
|---|---|
| Pulp and Paper, Volume 1 | $18.00 |
| Pulp and Paper, Volume II | 18.00 |
| Principles of Management | 6.50 |
| Paper and Paperboard Making | 6.00 |
| Procedure Handbook of Arc Welding | 2.00 |
| Outside U.S.A. | 2.50 |
| Drying of Paper on the Machine | 1.50 |
| Lessons in Papermaking—Part 1 | 1.50 |
| Lessons in Papermaking—Part 2 | 1.50 |
| Notes and Observation on Beaters | 1.00 |
| Trouble on the Paper Machine | .75 |
| Pulp Bleaching (A Symposium) | .50 |
| Technology of Papermaking Fibres | .50 |

*Mail your order with payment to:*

**The PAPER INDUSTRY**

431 S. Dearborn Street, Chicago 5, Illinois

# MARKET QUOTATIONS

## RAGS (Domestic)

**NEW RAGS**

The following are quotations to mills, f.o.b. New York:

| | per cwt. |
|---|---|
| No. 1 White Shirt Cuttings | 14.50 to 15.50 |
| New Unbleached Muslins. | 16.25 to 16.75 |
| Fancy Shirt Cuttings | 5.50 to 6.00 |
| No. 1 Percales | 6.50 to 7.00 |
| No. 1 Washables | 2.75 to 3.00 |
| No. 1 Light Silesias | 7.50 to 8.00 |
| No. 1 Light Prints | 5.25 to 5.75 |
| Light Flannelettes | 7.50 to 8.00 |
| Cottonades | 3.75 to 4.00 |
| Blue Overalls | 8.00 to 8.50 |
| Blue Cheviots | 8.00 to 8.50 |
| Canton Flannels, Bleached | 11.50 to 12.00 |
| Canton Flannels, Unbleached | 11.50 to 12.00 |
| Osnaburg Cuttings | 11.00 to 11.50 |
| Underwear Cuttings, Bleached | 15.50 to 16.50 |
| Underwear Cuttings, Unbleached | 15.50 to 16.50 |
| Khaki Cuttings— | |
| Sun Tan | 6.25 to 6.75 |
| Mixed | 3.75 to 4.00 |
| Linen Cuttings— | |
| American | 7.50 to 8.00 |
| White | 12.00 to 13.00 |
| Grey | 12.00 to 13.00 |

## RAGS (Domestic)

**OLD RAGS**

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

| Roofing | Per cwt. |
|---|---|
| No. 1 | 1.45 to 1.55 |
| No. 2 | 1.35 to 1.45 |
| No. 3 and 4 | 1.05 to 1.15 |
| Twos and Blues— | |
| Repacked | 2.75 to 3.00 |
| Thirds and Blues— | |
| Repacked | 2.50 to 2.75 |
| Miscellaneous | 2.15 to 2.35 |
| Whites, No. 1— | |
| Repacked | 4.25 to 4.50 |
| Miscellaneous | 3.50 to 3.75 |
| Whites, No. 2— | |
| Repacked | 3.25 to 3.50 |
| Miscellaneous | 2.75 to 3.00 |

## RAGS (Foreign)

ex dock New York City

**NEW RAGS**

per cwt.

Nominal

New Dark Cuttings
New Mixed Cuttings
New Light Silesias
Light Flannelettes
Unbleached Cuttings
New White Cuttings
New Light Oxfords
New Light Prints

## RAGS (Foreign)

ex dock New York City

**OLD RAGS**

per cwt.

Nominal

No. 1 White Linens
No. 2 White Linens
No. 3 White Linens
No. 4 White Linens
No. 1 White Cottons
No. 2 White Cottons
No. 3 White Cottons
No. 4 White Cottons
Extra Light Prints
Ord. Light Prints
Med. Light Prints
Dutch Blue Cottons
French Blue Cottons
French Blue Linens
Checks and Blues
Linsey Garments
Dark Cottons
Old Shopperies

## ROPE and BAGGING

f.o.b. and ex dock New York City

| | per cwt. |
|---|---|
| Gunny No. 1— | |
| Foreign | 5.50 to 6.00 |
| Domestic | 5.50 to 6.00 |
| Wool Tares— | |
| Light | 5.50 to 6.00 |
| Heavy | 5.75 to 6.25 |
| No. 1 Scrap Bagging | 4.75 to 5.25 |
| Manila Rope— | |
| No. 1 large, dom. | 8.00 to 8.50 |
| No. 1 small | 7.00 to 7.50 |
| Sisal Rope— | |
| No. 1 large | 6.00 to 6.50 |
| No. 1 small | 5.50 to 6.00 |
| New Burlap Cuttings | 6.75 to 6.25 |
| Jute Threads— | |
| Foreign (Nom.) | 6.00 to 6.25 |
| Domestic | 6.25 to 6.50 |
| Strings— | |
| No. 1 sisal | 4.75 to 5.00 |
| No. 2 sisal | 4.25 to 4.50 |
| Soft jute | 4.75 to 5.00 |
| Mixed | 2.00 to 2.25 |

## WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

| Shavings— | per ton |
|---|---|
| Hard White Env. Cuts. | 140.00 to 150.00 |
| Hard White No. 1 | 110.00 to 115.00 |
| Soft White, one-cut | 95.00 to 100.00 |
| Soft White, No. 1 | 80.00 to 85.00 |
| Fly Leaf No. 1 | 45.00 to 50.00 |
| Fly Leaf, Woody No. 1 | 45.00 to 50.00 |
| No. 2 Mixed Col. Woody | 35.00 to 40.00 |
| Flat Stock— | |
| No. 1 Heavy Books and Magazines Repacked | 38.00 to 40.00 |
| Mixed Books | 28.00 to 30.00 |
| Ledger Stock— | |
| No. 1 White | 65.00 to 70.00 |
| No. 1 Mixed (Colored) | 42.50 to 47.50 |
| Manilas— | |
| New Env. Cuttings | 85.00 to 90.00 |
| New Cuts, One-Cut— | |
| Extra Manilas | 21.00 to 22.00 |
| Manila Tab Cards, Free of Ground Wood | 95.00 to 100.00 |
| Colored Tab Cards | 75.00 to 80.00 |
| Kraft— | |
| New Envelope Cuttings | 85.00 to 90.00 |
| Tripled Sorted No. 1 100% | 45.00 to 50.00 |
| No. 1 Old Assorted | 32.50 to 37.50 |
| News— | |
| White Blank | 85.00 to 90.00 |
| Overissue | 31.00— |
| No. 1 Folded | 25.00— |
| Old Corrugated Containers | 26.00— |
| New Jute Corrugated Cuts | 31.00— |
| Mill Wrappers | 24.00— |
| Box Board Chips | 16.00— |
| No. 1 Mixed Paper | 14.00— |

## CHEMICALS

f.o.b. shipping point

| | |
|---|---|
| Alum (Papermakers)— | |
| Lump, cwt. | 5.05— |
| Ground, cwt. | 4.30— |
| Powdered, cwt. | 5.20— |
| Blanc Fixe— | |
| Pulp, bulk, ton | 110.00— |
| Dry, barrels | 115.00— |
| Bleaching Powder— | |
| Drums, cwt | 5.02 to 6.50 |
| Casein (Domestic Standard) 20-30 mesh (bags), lb. | |
| 80-100 mesh (bags), lb. | 32.00 to 34.00 |
| Argentine, lb. | 29.00 to 30.00 |
| China Clay— | |
| Domestic Filler Bulk (mine) ton | 10.00 to 19.00 |
| Domestic Coating Bulk (mine) ton | 17.00 to 25.00 |
| Imported (ship side) Bulk (lump) ton | 20.00 to 30.00 |
| Chlorine— | |
| Tank cars (wks) cwt. | 3.05— |
| Gelatine (silicon), lb. | 1.25 to 1.35 |
| Glyc. (C.P.) drums, lb. | .30½ to .31 |
| Litharge. Powd. bbl. | .17½ to .18 |
| Rosin (Gum)— | New York, per 100 lbs. |
| E | 9.55— |
| F | 9.55— |
| G | 9.55— |
| WW | 9.70— |
| Rosin (Wood), carlots, F.O.B. South | 6.50— |
| Salt Cake— | |
| Dom. bulk (wks) ton | 28.00 to 29.00 |
| Imp. bulks on dock— (Atl. ports) ton (Nom.) | 22.00— |
| Soda Ash— | |
| Bulk (works) cwt. | 1.45 to 1.50 |
| Paper bags, cwt. | 1.80— |
| Soda (Caustic)— | |
| Solid, drums, cwt. | 4.10 to 4.85 |
| Ground and flake, drums, cwt. | 4.50 to 5.25 |
| Sodium Silicate— | |
| 60 deg. 55 gal. Grums. (works) cwt. | 1.60 to 1.70 |
| 40 deg. 35 gal. drums, (works), cwt. | 1.35 to 1.40 |
| Starch— | |
| Pearl, 140 lb. bags, cwt. | 6.30— |
| Pearl, barrels, cwt. | 6.39— |
| Paper (8q.) bags, cwt. | 6.39— |
| Powdered, barrels, cwt. | 6.60— |
| Sulphur (Crude) (Mine) bulk, long ton | 26.50 to 28.00 |
| Talc— | |
| Dom. 100 lb. bags (mine) ton | 26.00 to 30.00 |
| Canadian | 35.00 to 45.00 |
| Titanium Dioxide— | |
| Barium Pig. bbls., lb. | .24½ to .26½ |
| Calcium Pig. bbls., lb. | .24½ to .26½ |
| Zinc Oxide, bags | 14.50 to 15.50 |

## WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

| | |
|---|---|
| Bleached Sulphite | 150.00— |
| Bleached Sulphite, Canadian | 150.00— |
| Unbleached Sulphite | 130.00— |
| Unbleached Sulphite, Canadian | 130.00— |
| Bleached Soda | 145.00— |
| Bleached Soda, Canadian | 142.50— |
| Kraft Bleached | 152.00 to 155.00 |
| Kraft, Bleach., Hardwood | 150.00— |
| Kraft, Bleach., Southern | 155.00— |
| Kraft, Bleach., Canadian | 155.00— |
| Kraft, Unbleached, Northern | 130.00— |
| Kraft, Unbleached, Southern | 117.50 to 122.50 |
| Kraft, Unbleached, Canadian | 120.00 to 130.00 |
| Kraft, Semi-Bleached, Southern | 140.00— |
| Sulphite Screenings | 72.50— |
| Sulphate Screenings | 67.50— |
| Groundwood | 80.00 to 85.00 |

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

| | |
|---|---|
| Bleached Sulphite, Swedish, freight allowed | 150.00— |
| Bleached Sulphite, Norwegian, freight allowed | 145.00— |
| Bleached Sulphite, Finnish, freight allowed | 150.00— |
| Unbleached Sulphite, Swedish, freight allowed | 130.00— |
| Unbleached Sulphite, Finnish, freight allowed | 130.00— |
| Kraft, Unbleached, Swedish, freight allowed | 125.00— |
| Kraft, Unbleached, Finnish, freight allowed | 125.00 to 150.00 |
| Kraft, Bleached, Swedish, on dock | 155.00— |
| Kraft, Bleached, Norwegian | 155.00— |

## PAPER

Quotations are mill quotations New York City

Boards—

Prices per ton, delivered in New York, 10 tons or more:

| | |
|---|---|
| Plain chip | 100.00— |
| News vat lined chip | 105.00— |
| .009 chip, rolls | 95.00— |
| Filled news | 97.50— |
| Solid news | 100.00— |
| White vat lined chip | 135.00— |
| Chip tube and can stock | 120.00— |
| Single manila lined chip | 150.00— |
| Single jute lined chip | 135.00— |
| Container, 42 lb. | 127.50— |
| Kraft liner | 130.00 to 140.00 |

White patent coated:

| | |
|---|---|
| .020 | 155.00— |
| .018 | 157.50— |
| .016 | 160.00— |

Book Paper f.o.b. New York— per cwt.

Machine coated, two sides

70 lb. No. 2 enamel; 25x 4 cases $17.25
38-500, trimmed 4 sides. Carloads $16.30
45 lb. enamel, 25x38-500, 4 cases $13.05
trimmed 4 sides. Carloads $12.10

Uncoated

55 lb. No. 2 offset, 25x38 4 cases $14.80
500, trimmed 4 sides. Carloads $13.85
50 lb. A Grade English Finish, 25x38-500, un 4 cases $14.05
trimmed. Carloads $13.10
20 lb. envelope, 17x22-500, untrimmed. Carloads $12.46
16 lb. tablet, 17x22-500. Carloads $11.35

Rag Content Bond—

(White, 5,000 to 10,000 lbs., basis 16 lb.)

| | |
|---|---|
| 100% rag | 59.80— |
| 75% rag | 45.45— |
| 50% rag | 36.20— |
| 25% rag | 29.70— |

Rag Content Ledger—

(White, 5,000 to 10,000 lbs.)

| | |
|---|---|
| 100% rag | 59.80— |
| 75% rag | 45.45— |
| 50% rag | 36.20— |
| 25% rag | 29.70— |

Sulphite Bond—

(White, 5,000 to 10,000 lbs., basis 16 lb.)

| | |
|---|---|
| No. 1 | 21.00— |
| No. 2 | 20.75— |
| No. 4 | 18.25— |

Sulphite Ledger—

(White, 5,000 to 10,000 lbs.)

| | |
|---|---|
| No. 1 | 21.50— |
| No. 2 | 20.50— |
| No. 4 | 19.00— |

News delivered in New York— per ton

| | |
|---|---|
| Rolls, Standard (Contract) | 129.00 to 132.00 |
| Rolls (Spot) | (Nominal) |
| Sheets | 140.00— |

Tissues (Carlots) f.o.b. New York—

| | per ream |
|---|---|
| White No. 1 | 2.00— |
| White No. 2 | 1.60— |
| Bleached Anti-Tarnish | 2.20— |
| Colored | 2.00— |
| Anti-Tarnish Kraft | 1.65— |
| Manila | 2.00— |
| Napkins, semi-crepe (12½ lb. to M shts.) per cs. | 1.00— |
| Napkins, full crepe and embossed (12½ lb. to Mshts.) per cs. | 1.00— |
| Toilet, Bleached (M shts.) per cs. | 9.35— |
| Toilet, Unbleached (M shts.) per cs. | 7.90— |

Wrappings (Kraft) f.o.b. New York— (Basis 50 lb. & heavier) per cwt.

| | |
|---|---|
| Standard wrapping | 8.50— |
| Butchers, counter rolls | 8.75— |
| Standard bag, mill rolls | 8.00— |
| Shipping sack, mill rolls | 8.25— |
| Gumming, mill rolls | 8.50— |
| Asphalting, mill rolls | 8.25— |
| Envelope, mill rolls | 9.75— |

# NEW BOOKS

## Books

ESTABLISHING OPTIMUM CONDITIONS FOR STORAGE AND HANDLING OF SEMIPERISHABLE SUBSISTANCE ITEMS. Edited by Harry Gorseline, Norbert Leinen and Emil Mrak. Quartermaster Food & Container Institute for the Armed Forces, Chicago Quartermaster Depot, U.S. Army, 1819 W. Pershing Rd., Chicago 9, Ill. 6x9. 130 pages. Paperbound. Free.

This report of the proceedings of a symposium on storage and handling covers the rate and extent of deterioration of packaged rations during storage and transportation, the effect of atmospheric changes and the economics of cold storage of field rations as compared with dry storage. An abundance of charts and tables shows graphically the effect on various types of foods of diverse storing conditions. A general conclusion may be drawn that for the most part cooler temperatures prolong the storage period of rations.

WORLD ECONOMIC GEOGRAPHY. Author, Earl B. Shaw. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 582 pages. $6.50.

Employing a four-fold approach, Dr. Shaw examines his subject from the standpoints of commodities, regions, activities, and principles.

The first section utilizes detailed individual illustrations for each of the four approaches. The economic geography of rubber, for example, is studied from the commodity point of view; a regional approach is used for the study of Guatemale; commercial corn and mixed farming are analyzed via an activity approach; and the discussion of mineral exploitation emphasizes the principles approach. From here on, the author mixes and matches these viewpoints as the topic demands.

Part II of the book covers the forest, fish, and animal industries. In the section covering world agriculture, the author discusses farming in the tropical rainforest, tropical Savanna agriculture, farming in low and middle latitude steppe lands, desert farming, farming in Mediterranean and west coast marine climates, agriculture in humid subtropical and continental lands, and farming in the subarctic. The final parts of the volume go into questions of manufacturing and trade and world population distribution.

SALT & WATER, POWER & PEOPLE. By Robert E. Thomas. Published by Hooker Electrochemical Co., Niagara Falls, N.Y. 6 x 9. 109 pages.

This short history of Hooker Electrochemical Co. was prepared to celebrate the 50th anniversary of the company. In 1905 the infant company began the manufacture of bleaching powder and caustic soda by the then new Townsend process. Today it manufactures hundreds of chemicals in eight plants, and a progressive research department promises that the total will grow. The story of Hooker is the story of healthy American industry.

## USFS Reports

SIZE, VOLUME, AND WEIGHT OF PINE SLABS AND EDGINGS IN THE SOUTH CAROLINA PIEDMONT (Station Paper No. 49). By Arthur S. Todd, Jr., and Walter C. Anderson. Published by Southeastern Forest Experiment Station, Asheville, N. C. 8 x 10½. 21 pages. This Station Paper reports on the sizes of pine slabs and edgings produced at small sawmills in the central Piedmont and on the volumes and weights of wood and bark components. Twenty-one tables are included. It is the second report from a continuing investigation of the problems of salvaging and marketing small-mill residues in this region.

HOW TO MEASURE FOREST FIRE DANGER IN THE SOUTHEAST (Station Paper No. 52). By Ralph M. Nelson. Published by Southeastern Forest Experiment Station, Asheville, N. C. 8 x 10½. 22 pages. This paper summarizes standards for locating, maintaining, and operating fire danger stations that have been established according to the system developed by the Southeastern Forest Experiment Station. The paper is written primarily for those who have the responsibility of supervising danger station operation, but it should also be of value to those who take and record danger measurements.


The Paper Industry

Professional and Business Services

Engineers — Industrial Plants • Textile & Paper Mills • Location Studies • Appraisals • Reports • Surveys
J. E. SIRRINE COMPANY
GREENVILLE SOUTH CAROLINA

MILL COGS
We make a specialty of "Ready Dressed" cogs which are READY TO RUN the moment driven and keyed. Write for circular "O" and instruction sheets free.
The N. P. BOWSHER Co., South Bend, Ind.

ENGLISH ECCO CLAYS TRADE MARK CLAYS
UNIFORM • SUPERIOR • DEPENDABLE
English China Clays Sales Corporation
551 Fifth Avenue, New York City

# PUT ACTION IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.

**SPEAKING OF SAFETY**

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

**HUMAN FACTORS IN SAFETY**

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

**SAFETY MANAGEMENT FOR FOREMEN**

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

***Write for complete information and details to the***

**NATIONAL SAFETY COUNCIL**

**425 North Michigan Ave., Chicago 11, Illinois**


# Index to Advertisers

***When writing them, please mention The PAPER INDUSTRY.***

***Refer to the Paper and Pulp Mill Catalogue and Engineering Handbook at your mill office for complete listing of all advertisers' products.***


ACF Industries, Inc., Valve Div. ..... 48
Aerovent Fan Company, Inc. ..... 66
American Cast Iron Pipe Co. .....
American Cyanamid Co. ..... 6
American Defibrator, Inc. .....
Anheuser-Busch, Inc. .....
Annin Company, The .....
Antara Chemicals Division .....
Appleton Machine Co., The ..... 24
Appleton Wire Works, Inc. .....
Appleton Woolen Mills ..... 22
Armstrong Machine Works .....
Arnold, Hoffman & Co., Inc. .....
Askania Regulator Company .....
Associated Industrial Consultants ..... 61
Asten-Hill Mfg. Co. ..... 2nd Cover
Aurora Pump Division .....

Babcock & Wilcox Co., Tubular Products Division .....
Barco Manufacturing Co. .....
Barrell Co., William L. .....
Bauer Bros. Co., The .....
Beloit Iron Works ..... 53-56
Black-Clawson Company, The ..... 21
Bowsher Co., The N. P. ..... 88
Burtonite Company, The ..... 78

Cameron Machine Co. ..... 17
Carthage Machine Co. ..... 81
Chain Belt Company ..... 14
Chemipulp Process Inc. ..... 81
Chicago Bridge & Iron Company ..... 10
Classified Advertising ..... 85
Clinton Foods Inc. ..... 20
Cooper Alloy Corporation .....
Corn Products Refining Co. ..... 25
Crane Packing Company ..... 51
Crawford Fitting Company ..... 65
Curtiss-Wright Corporation .....

Darling & Company ..... 3rd Cover
DeZurik Shower Company .....
Draper Brothers Company .....

Eastwood-Nealley Corporation .....
Egan & Company, Frank W. .....
Electric Eye Equipment Company .....
English China Clays Sales Corp. ..... 88

Falk Corporation, The .....
Fischer & Porter Company ..... 76
Fisher Governor Co. ..... 1
Fritz Publications, Inc. ..... 64, 83, 86

General Chemical Division ..... 58
General Dyestuff Company .....
Gilbert & Nash Company ..... 70
Goslin-Birmingham Mfg. Co. .....
Graebner Executive Exchange .....
Graton & Knight Company ..... 82

Hanchett Manufacturing Co. ..... 66
Hercules Powder Company .....
Hubinger Company, The .....
Hudson-Sharp Machine Company ..... 84
Humphrey Elevator Company .....
Huyck & Sons, F. C. .....

Improved Machinery, Inc. ..... 73
Ingersoll-Rand .....

Jackson & Church Company .....
Jeffrey Manufacturing Co. .....
Jenssen Company Inc., G. D. .....
Johnson Corporation, The ..... 66
Jones & Sons Company, E. D. ..... 4
Josam Manufacturing Company .....

Kalamazoo Tank & Silo Co. ..... 86
Kelco Company ..... 12
Keystone Valve Corp. .....
Kidder Press Company .....
Koppers Company, Inc. ..... 15

Langston Co., Samuel M. .....
Layne & Bowler, Inc. .....
Lindsay Wire Weaving Co., The ..... 62
Link-Belt Company ..... 11
Lockport Felt Company ..... 4th Cover
Lodding Engineering Corp. ..... 16, 69

Magnuson Products Corp. .....
Master Builders Co., The ..... 85
Mead Pulp Sales, Inc. .....
Midvale Company, The .....
Minerals & Chemicals Corp. of America ..
Morden Machine Company .....
Morningstar, Nicol, Inc. .....
Murray Mfg. Co., D. J. .....

Nash Engineering Co., The ..... 63
National Aluminate Corp. ..... 2
National Aniline Division ..... 27
National Safety Council ..... 89
National Starch Products, Inc. .....
Naylor Pipe Company .....
Nichols Engr. & Research Corp. .....
Northern Engineering Works ..... 59
Northwest Engineering Company ..... 8
Norton Company ..... 74

Oldbury Electro-Chemical Company .....

Paper and Pulp Mill Catalogue ..... 64
Paper Industry, The ..... 83, 86
Penick & Ford, Ltd., Inc. .....
Photovolt Corporation ..... 85
Powell Valves ..... 19
Preload Company, Inc., The .....
Pusey & Jones Corp., The ..... 46

Raymond Service, Inc., Chas. P. ..... 85
Read Standard Corporation ..... 60
Red-Ray Mfg. Co., Inc. .....
Roots Connersville Blower Division ..... 77
Ross Engineering Corp., J. O. .....
Ross Midwest Fulton Corp. .....
Ross Paper Machinery Company .....

Seamlex Company, Inc. ..... 78
Semet-Solvay Petrochemical Division ..... 9
Shuler & Benninghofen ..... 45
Signode Steel Strapping Company ..... 13
SKF Industries, Inc. .....
Smidth & Co., F. L. ..... 52
Smith & Serrell, Inc. ..... 83
Stadler, Hurter & Company ..... 86
Staley Mfg. Co., A. E. .....
Standard Oil Co. (Indiana) .....
Stein, Hall & Company .....
Stickle Steam Specialties Co. .....
Sutherland Refiner Corp. ..... 26
Swenson Evaporator Company ..... 1st Cover

Taylor-Wharton Division .....
Testing Machines, Inc. ..... 79
Texas Gulf Sulphur Co. .....

United States Movidyn Corp. ..... 18

Valley Iron Works Company .....
Vapo Systems Co., Inc. ..... 82

Weyerhaeuser Timber Co. ..... 28
Whiting Corporation ..... 1st Cover
Williams-Gray Company .....
Wisconsin Wire Works .....
Worthington Corporation .....

Yarnall-Waring Company .....
Youngstown Welding & Engineering Company, The ..... 23


Professional & Business Service Section


Sirrine Company, J. E. ..... 88

PAPER INDUSTRY

# Whither?

## . . . in production, processes, new products, markets

***Pulpwood at a Premium***

The current $1.3 billion two-year expansion program in the South has accentuated the wood procurement problem. The consumption of pulpwood in the southern states was 19,000,000 cords in 1955, which is nearly 60 per cent of the total national annual consumption of 33,000,000 cords.

In an effort to assure adequate and continued supplies of pulpwood for these mills, paper manufacturers in the South are going all out to extend their control over available forest lands. The area now so controlled amounts to 13,000,000 acres, and the nature of such control is through (1) assumption of direct ownership, (2) entering into 60-99 year leases, (3) signing "refusal" contracts with farmers, and (4) establishment of pine tree plantations—this year some 600,000 acres, it is estimated, will be planted with pine tree seedlings. Pulpwood delivered at the mill is now selling for as much as $17-$22 per cord.

***Fiber Drums for Packaging Liquids***

Research and development are constantly progressing with the view to improving fiber drums to extend their area of application. While they were first designed primarily for shipping dry products, they are now being developed by Continental Can Co. to permit packaging of liquid and semi-liquid products. Resilience to impact is one of the principal qualities of these drums. They are now so designed as to withstand a 4-ft. drop when fully packed, with contents weighing up to 400 lb.

***Hydro-air Pressure Cleaning***

Cleaning operations in paper mills have been simplified and cleaning costs reduced by the introduction of the hydro-air pressure cleaning system. The equipment involved consists of a high-pressure pump (1000 psi and 25 gpm) and a patented gun that mixes air and water at the instant of discharge. A self-propelling nozzle is especially effective for cleaning pipes. The method is used to clean couch and press rolls, screens, felts, stock chests, piping, etc.

***Sizing Mechanism in the Beater and on the Machine***

A proposed mechanism of sizing involves the precipitation of sodium resinate with alum resulting in the flocculation of resin and aluminum hydroxide, which are then sintered on the paper machine to form aluminum resinate. The smallest rosin flocs (three times the size of particles in a rosin emulsion) give the best sizing results. Their formation depends on the pH (optimum pH is 4.5) and on the beater temperature.

The formation of aluminum resinate in the paper sheet on the machine proceeds with the evaporation of water, after a solids content of 65 per cent has been reached. The moisture content of the sheet leaving the drying section of the machine is therefore an indication of the type of sizing achieved.

***Paper Mail Bags in Use***

The canvas mail bag is a thing of the past in ocean-going shipments to Alaska. It has been replaced by a water-repellent container made of paper reinforced with fiber glass. The paper container holds 75 lb., weighs 15 oz., costs 31 cents and is disposable after a single use.

# Yours for Better Fishing!

## ...and for lower costs, too!

• IN FLOTATION TYPE SAVEALLS—comparative, competitive tests in paper mills throughout the country have established this significant fact—

**In the great majority of cases, one of DARLING'S specifically-formulated GLUES will reduce costs, while maintaining or improving flocculating efficiency.**

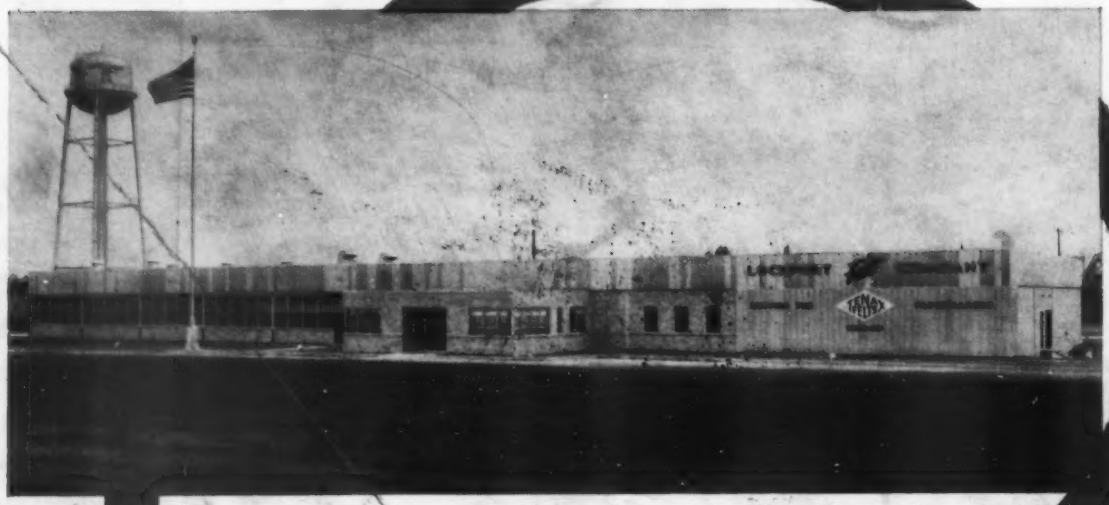
We'd like to work with you in making just such a test in your mill. The entire cost is on us. You've nothing to lose... plenty to gain. You can make arrangements through your Darling sales representative. Or write or call us collect.

• *You can get the same cost advantages from* DARLING'S *specifically-formulated* GLUE *used as an additive for improved* RETENTION!

**DARLING & COMPANY**
GLUE DIVISION
4201 South Ashland Avenue • Chicago 9, Illinois

DARLING'S improved BONE GLUE

# *First in the South!*



**New Lockport Felt Mill at Starkville, Miss.**

- PLANNED IN 1953
- GROUND BROKEN IN 1954
- COMPLETED IN 1955
- PRODUCED TENAX FELTS IN 1955

## *Years-ahead Service to the Paper Industry*

Keeping ahead of the paper industry's needs is a basic policy at Lockport Felt. After World War II, when paper concentrated 90% of its expansion in the Southern United States, Lockport turned its sights there, too. Now, the task of providing a new TENAX FELT Mill in the South is completed. The first paper machine felt ever woven in the South was delivered from the Starkville Mill in December of 1955.

Lockport is proud of this "first" . . . of this new ability to offer faster, more direct, more efficient service to the Southern paper industry. Starkville benefits all papermakers, by freeing production capacity at the Newfane Mill. Recently expanded, with new equipment in many departments, the Newfane Mill is providing better-than-ever service to paper and board makers everywhere in the world.

**LOCKPORT FELT COMPANY**

NEWFANE, NEW YORK — STARKVILLE, MISSISSIPPI

*Serving the Paper Makers Since 1891*

TENAX FELTS